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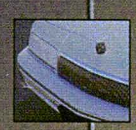

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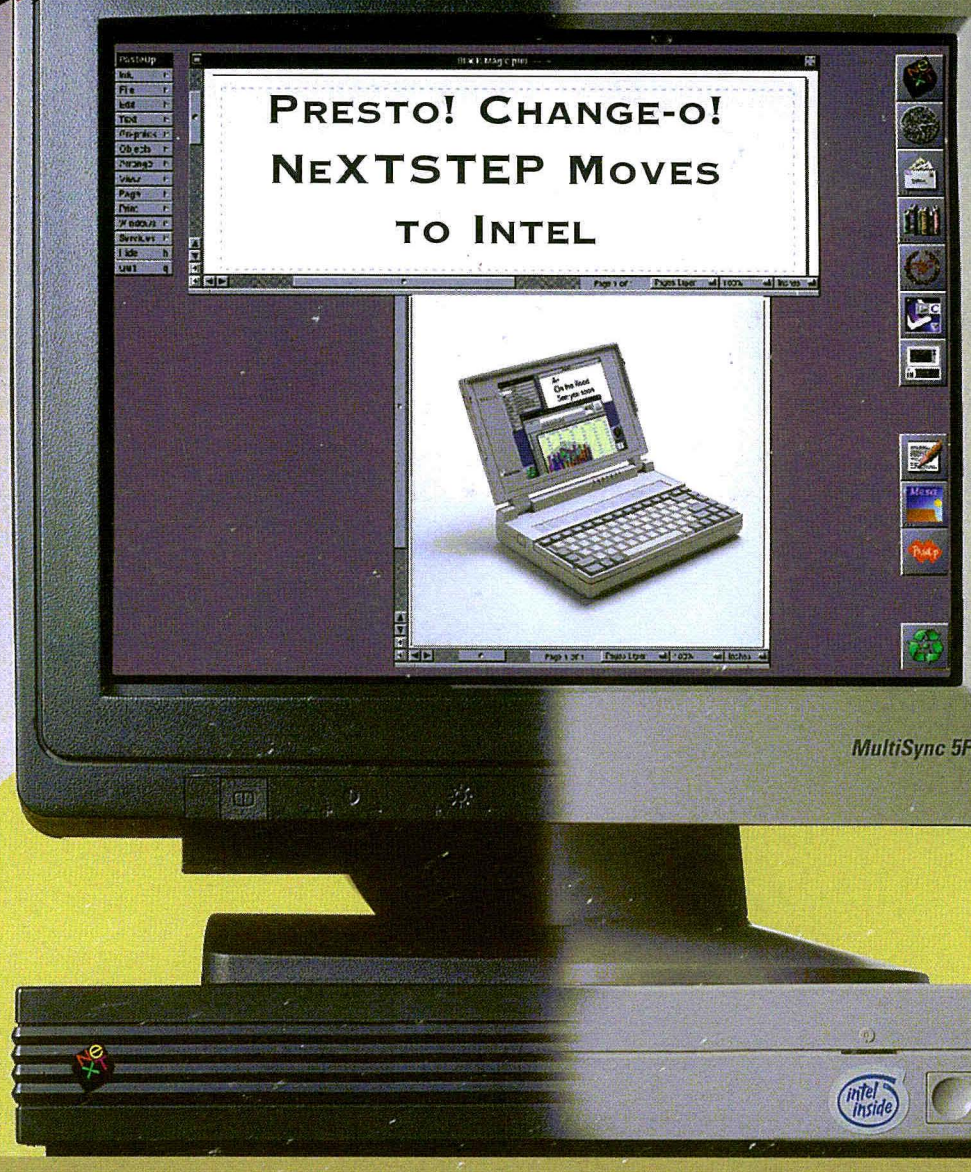


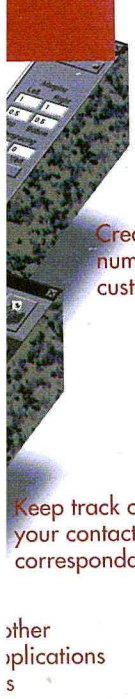

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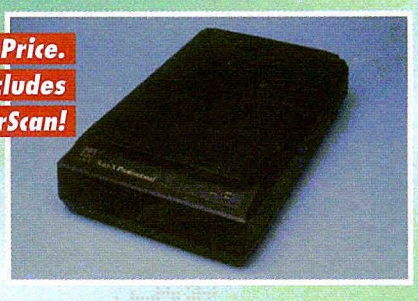

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NEXTWORLD

April/May, Volume 3, Issue 2

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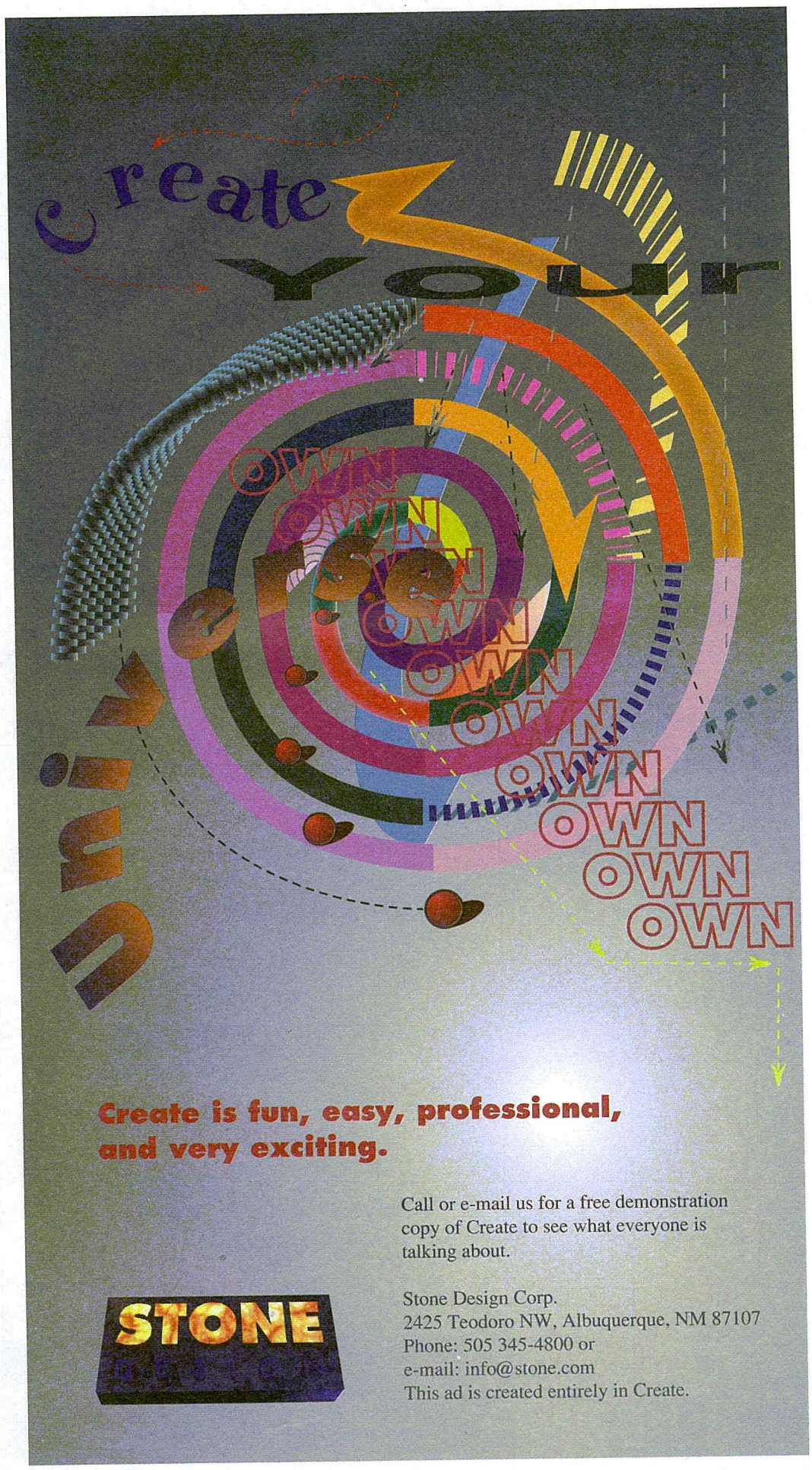
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# Black Tuesday

DAN RUBY

Even though we had all seen it coming for some time, Black Tuesday hit the community hard. The embodiment of NeXT's original vision, its elegant black hardware, was dead. The keepers of the flame, hundreds of dedicated NeXT employees, were gone, too.

But if the physical manifestation of the vision is gone, the dream itself lives on in the form of NeXTSTEP software. With its decision to abandon hardware sales, NeXT now becomes the computerless computer company described in an influential 1992 *Harvard Business Review* article. NeXT has proven the article's premise: Hardware is a commodity and innovative hardware is an anchor. The real value of computers is delivered in software – operating systems, databases, development tools, user interfaces, and applications.

In those areas, NeXT leads the field. As long as it sold hardware, NeXT was limited to slugging it out for a minority share of a minority workstation market. Now NeXT is free to offer its true software advantages on whatever hardware is dominant. Today it's '486 PCs. Tomorrow it's Pentium, Power PC, SPARC, HP-PA, and Alpha.

Instead of playing on the fringes of the market, NeXT now moves to the mainstream of corporate computing. As our cover stories in this issue demonstrate, NeXTSTEP on white hardware is little different than NeXTSTEP on black hardware. The real difference is NeXTSTEP itself, which will now stand on its own in the race against Microsoft, Taligent, and the other contenders for the object-oriented operating-system market of the future.

In the next phase of corporate computing, the focus on individual productivity will be replaced by the need to maximize operational productivity. To serve that emerging need, today's dominant operating systems will give way to fully object-oriented, client-server systems. Alone among current offerings, NeXTSTEP provides those capabilities today.

Of course, there are still hurdles to clear. NeXT's software, like its hardware, is nonstandard. Customers still must choose NeXTSTEP in place of more accepted operating systems. But the bar is lower. Users don't need to make as high a commitment of dollars to try NeXTSTEP, and they also can use it in conjunction with other systems.

The result is that NeXT can be expected to capture many more corporate seats with its software than it would have with its hardware. That's great news for developers, dealers, consultants, and customers. While Black Tuesday was a traumatic shock to the system, the reality is that White Wednesday offers far greater opportunity to the NeXT community.

★ ★ ★

When we planned the black-and-white concept for the issue, we didn't know of NeXT's impending decision to fundamentally change its business model. Scrambling quickly, we modified our cover, inserted a news analysis of NeXT's decision, and rewrote several of our columns.

As the NeXT community now regroups for NeXTWORLD Expo in May, deeper reflection and analysis remains ahead. For now, we must absorb the shock and deal with immediate ramifications. Uppermost among these is the fate of NeXT's installed base of Motorola hardware. NeXT's announced ongoing service provisions are reassuring, but we'd also like NeXT to guarantee timely delivery of future software releases for black hardware.

An era is over, but the dream lives on. As NeXT moves on to new markets and customers, it must also demonstrate its loyalty to the true believers who have been with NeXT since the beginning.

DAN RUBY *is editor in chief of* NeXTWORLD.

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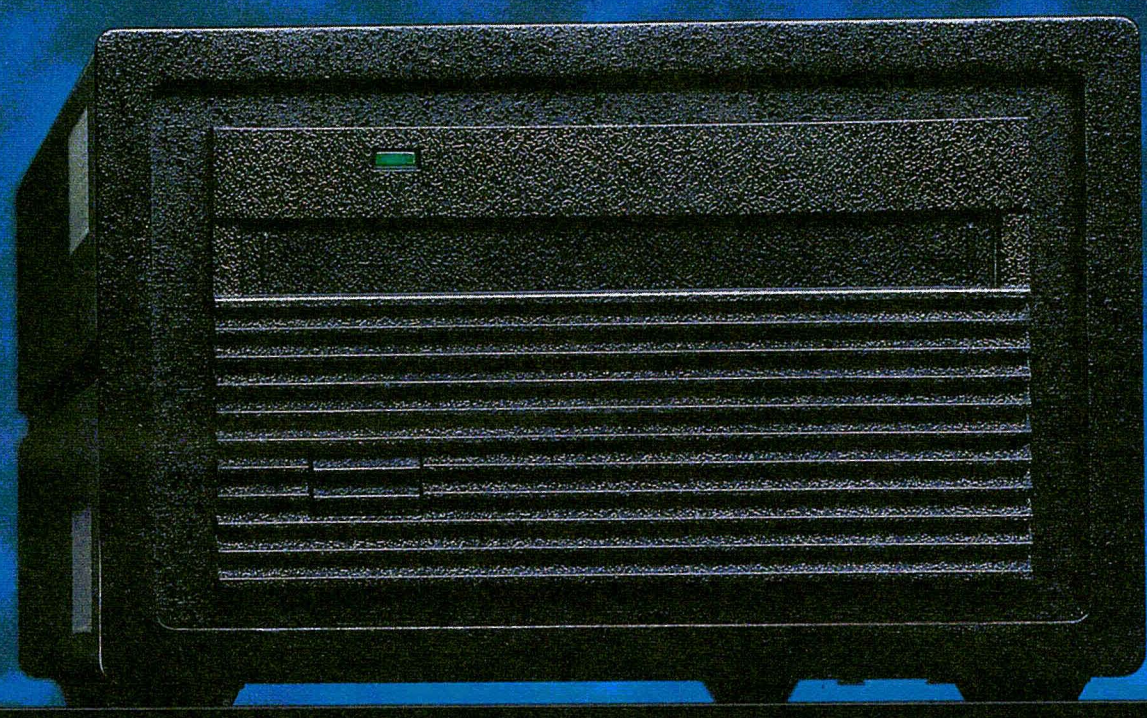

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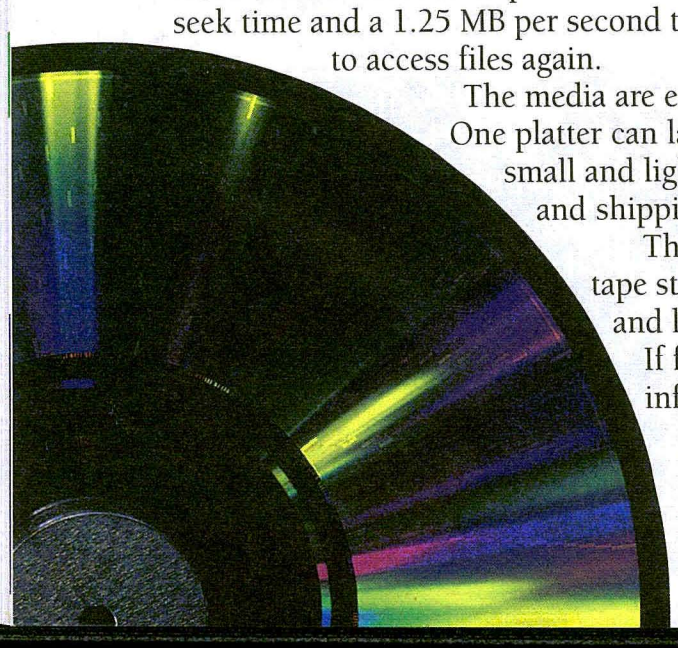

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## Software forever

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BRIAN LEAKE
Houston

*See our cover story in th
our first impressions of
'486. – NW*

## Hardware dies har

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Without a low-cost NeXT
NeXTSTEP will whither.

DAVE ERICKSON
Los Angeles

For six months, I've been r
*NeXTWORLD* and elsew
NeXT is losing its edge o
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## Software forever

I am concerned about the delays in shipping NeXTSTEP '486. Has anyone actually seen it? *NeXTWORLD*'s purpose is obviously to report the news there is, but perhaps you should also report the news there isn't. The main problem for NeXT is that sooner or later Windows NT is going to arrive. AT&T has already released Destiny (its fledgling PC UNIX). If NeXT is to survive the next 18 months, it has got to take development and promotion of NeXTSTEP '486 very seriously.

BRIAN LEAKE
Houston

*See our cover story in this issue for our first impressions of NeXTSTEP '486. – NW*

## Hardware dies hard

In "Sleeping with the Enemy," in the February/March issue of *NeXTWORLD*, Simson Garfinkel expressed the opinion that NeXT's "mother of all competitors" is Microsoft and not Sun Microsystems. I agree. But the nature of that competition has to be clarified. Microsoft software is successful primarily because of IBM PC clones. The expansive features and low cost of these machines makes them attractive regardless of the deficiencies of DOS and its offspring.

At this stage, I doubt that NeXTSTEP '486 can have much of an impact on Microsoft's dominance. Where NeXT can make a difference is in the hardware arena. In other words, NeXT hardware must drive NeXTSTEP rather than the other way around. How so? IBM PC clones are ubiquitous. So too must low-cost NeXT clones be ubiquitous.

If, as Steve Jobs has stated, his goal is to create a new PC standard, then he must allow that standard to propagate in the open market. You can't have your cake and eat it too. Without a low-cost NeXT clone, NeXTSTEP will whither.

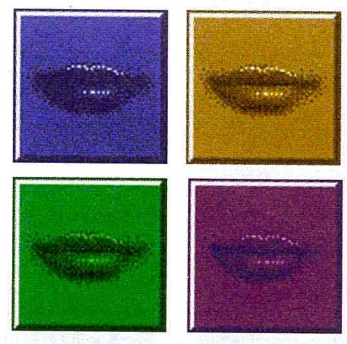
DAVE ERICKSON
Los Angeles

For six months, I've been reading in *NeXTWORLD* and elsewhere that NeXT is losing its edge on hardware production and focusing primarily on software. Well, I don't think NeXT should be a "software company that happens to make good hardware"; it should make both!

The reason I fell in love with NeXT is because it squeezed more standards and innovation into the black box than any other desktop-computer manufacturer. NeXT made bold moves when it included the DSP and the optical drive as standard equipment.

The only reason a PC is worth anything is because of the Intel chip inside. To have great software like NeXTSTEP, you need great hardware to run it on!

MARK ERICKSEN
Tacoma,
Washington




## Reality check

The claim in "Perception and Reality" (*NeXTWORLD*, February/March) that "3D Reality is a polygon-based renderer" is misleading. Photo-Realistic RenderMan and Quick RenderMan are environments for rendering descriptions of 3-D Geometry and visual attributes into images for either interactive use or final production. 3-D Geometries are collections of primitives consisting of polygons, curved surface patches, or NURBs (Non-Uniform Rational B-splines). Any of these can be combined to form new, more complex geometries, and these can be modified by procedural or texture-based shading.

Also, the article failed to explain that shaders can be more than simple patterns mapped to the surface of an object – they can also provide light sources, shadows, reflections, displacement mapping, or even volume shading. We acknowledge that it would be extremely useful to have some sort of indication of progress being made on rendering jobs, as suggested in the review. At this point in time, the 3DKit (and the underlying Photo-Realistic Rendering engine – prman) provide no means for this. We are addressing the problem and should have a solution soon.

However, we believe that the other criticisms are the price that one pays for working with extremely new technology. The advantages to using the 3DKit far outweigh the ramifications of not using it. By building 3D Reality on top of the 3DKit (and the rest of the tools that NeXTSTEP provides), we feel we have built the most extensible and flexible 3-D graphics tool on any platform.

ANDREW STONE
and BILL BUMGARNER
Stone Design
Albuquerque,
New Mexico

*Due to a production error, cube ratings for two products were incorrect in the February/March issue. Stone Design's 3D Reality should have had 2.5 cubes, while Adamation's What's Happeing? should have had 3.5 cubes. – NW*

## Nix on IXKit?

In John Perry Barlow's column ("Vanishing Point," February/March), kudzu seems to be taking some liberty as well as revenge. He writes, "Unfortunately, in allocating resources to NeXTSTEP '486, NeXT has dropped support for the indexing tool kit, the engine that drives DataPhile."

This is incorrect. NeXT has invested several man-months in bug-fixing the IXKit for 3.1 and porting it to '486. The kit is central to the operation of Help, Librarian, Webster, BuildDisk, Installer, and Upgrader, as well as several internal and future products.

JACK GREENFIELD
NeXT Computer
Redwood City, California

*At the time Barlow wrote his column, the IXKit was in peril of becoming a victim of resource limitations. After consultation with several large customers and commercial developers, NeXT reconsidered its decision and has since completed the fix for IXKit. – NW*

## Mail fraud

This is an open letter to all software vendors who advertise in *NeXTWORLD* and to the magazine's editors. I notice a lot of companies running ads without e-mail addresses and I read reviews where only phone numbers and snail mail addresses are listed. For people like me who hate the phone, e-mail addresses would be a saving grace.

ROB WYATT
Los Angeles

## For the record

*In our article "Just the Fax," in the Winter 1992 issue, we reviewed and showed a photograph of the ZyXEL 1496S modem, which includes an LCD front-panel display. We have discovered that B&W Software's bundled price of $600 includes the 1496E modem, not the 1496S. While the two modems function the same with B&W's NXFax software, the 1496E is physically smaller and does not include the two-line LCD display found on the 1496S. Users who want the LCD display can purchase the 1496S modem bundled with B&W's NXFax software for $800.*

*In the February/March "New in Shrinkwrap," we described BOSS Document Manager 2.0 incorrectly. The program is designed for full document life-cycle management, including revision control and security.*

*In "Scanning the Landscape,"* NeXTWORLD *February/March, the prices and resolution of HSD scanners were incorrect. Its color scanner is $1995; the grayscale costs $1495; and the maximum resolution of both is 2400 dpi.*

***NeXTWORLD welcomes your comments. Please send them to Letters at NeXTWORLD, 501 Second St., San Francisco, CA 94107; or e-mail: letters@nextworld.com.***

# Painful Transition

## NeXT reinvents itself as software company

BREAKING NEWS

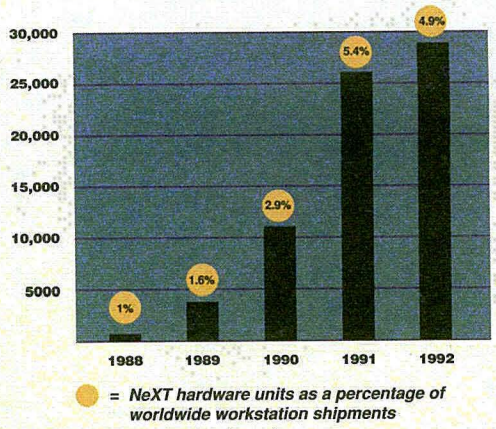
NEXT'S MASSIVE TRANSFORMATION FROM HARDWARE MANUFACTURER TO systems-software supplier will leave many users, developers, and former employees temporarily dislocated, but a new, stronger NeXT is likely to emerge from the wreckage.

According to NeXT CEO Steve Jobs, the company faced a choice: "We could continue and be a second-tier hardware company like SGI or change and be a first-tier software company like Microsoft." NeXT cannot do both because it lacks the management and financial bandwidth, Jobs said.

### NeXT in Transition

- Discontinue sales of '040 NeXT hardware
- Hardware engineering sold to Canon
- Hardware manufacturing to be sold or shut down
- Downsizing of sales, marketing, and administration
- Approximately 280 employees laid off

**NeXT hardware units shipped worldwide**




Source: International Data Corporation

The radical change in the company's structure and strategy was announced February 10 and is now underway (see charts). NeXT will discontinue production, development, and sales of its own hardware. The company will shrink from 530 employees to as few as 200 as a result of significant cuts in sales, marketing, and administration staff, as well as the elimination of most hardware-related jobs. It will change its name from NeXT Computer, Inc. to NeXT, Inc.

Acting on the advice of its customers, partners, and investors, NeXT will focus all of its resources toward making NeXTSTEP a dominant object-oriented operating system (OOOS). NeXT cites new numbers from industry analysts at IDC that the OOOS market will grow to almost $3 billion in 1996, more than the projected sales of traditional desktop operating systems.

For NeXT, this is an opportunity to compete for the mainstream business client-server market, which has been closed to the company as long as it sold a nonstandard hardware platform. But as it reaches for the brass ring, NeXT cannot ignore the marketing might of Microsoft, which is developing an object-oriented extension of Windows NT, code-named Cairo, for delivery in late 1994. The only other competitor NeXT foresees is Taligent, the joint Apple/IBM system-software venture, which is also a probable two years from shipment. (NeXT discounts SunSoft's Solaris-based Project DOE as a distant also-ran in the object-oriented race.)

"There's room for at least two players here, like Hertz and Avis," said Jobs, "and unless we're incompetent, we can at least be Avis." NeXT claims to have a lead of two to three years on the competition.

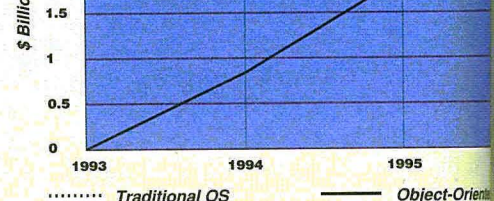
NeXT observers agree that the company can be competitive in the operating-system market now that it has shed its hardware legacy. "NeXT has removed the biggest barrier to the rapid deployment of NeXTSTEP," said Jonathan Schwartz, president of Lighthouse Design. "This removes the barriers to negotiating strategic partnerships with hardware manufacturers."

Without the drag of hardware, sales of NeXTSTEP should be far easier. While 100 units of NeXT hardware might be a $1 million purchase decision requiring the approval of committees and vice-presidents, the same order for NeXTSTEP might cost only $75,000, an expenditure that can be approved at a lower level. With the reduced cost structure of the company, NeXT makes just about as much profit on the software sale.

### The New NeXT

- Software-only product line
- Support to be provided for '040 installed base
- Strategy to port NeXTSTEP to wide hardware b
- Target object-oriented operating-system mark
- Approximately 200 employees

**Object-oriented vs. traditional operating system revenues**



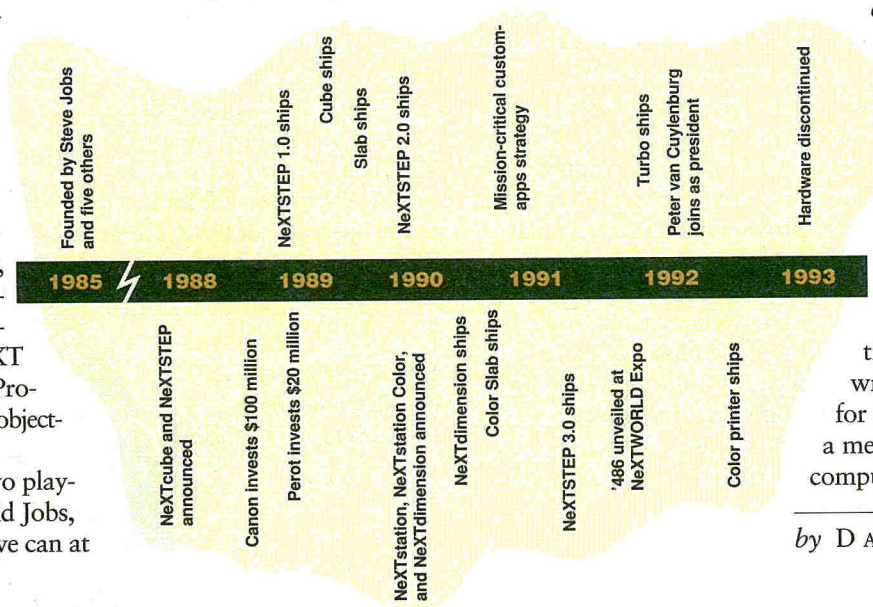

Source: International Data Corporation, 1993

Though NeXT's future may be bright, it expects some difficult months ahead. Current owners of NeXT hardware will undoubtedly feel nonplussed – even though NeXT will make provisions for service and support of existing hardware for at least the next five years. Besides being the right thing to do for its customers, NeXT has to provide such support under its contracts with government buyers.

Until NeXTSTEP for Intel ships later this year, NeXT's revenue will drop precipitously. The same will also likely hold for NeXT's third-party partners. Lighthouse Design said it prepared for lean times and will use the lull to ready its '486 products, but some other developers may face trouble.

Longer term, the news is probably good for third parties and others whose fortunes depend on the size of the installed base. "All third parties care about is the number of seats out there," said Kim Orumchian, NeXT's manager of strategic relationships.

NeXT has faced tumultuous times since its 1985 founding (see time line). Now, as it makes its wrenching transition, NeXT appears for the first time to be positioned to get a meaningful share of the mainstream computer market.




*by* DAN LAVIN *and* DAN RU

*President*

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PHOTOGRAPH BY STUART WATSON

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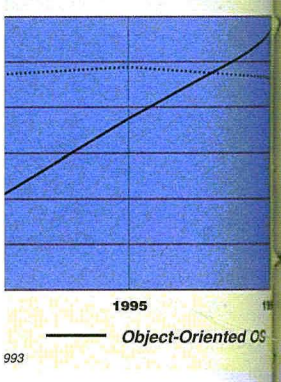


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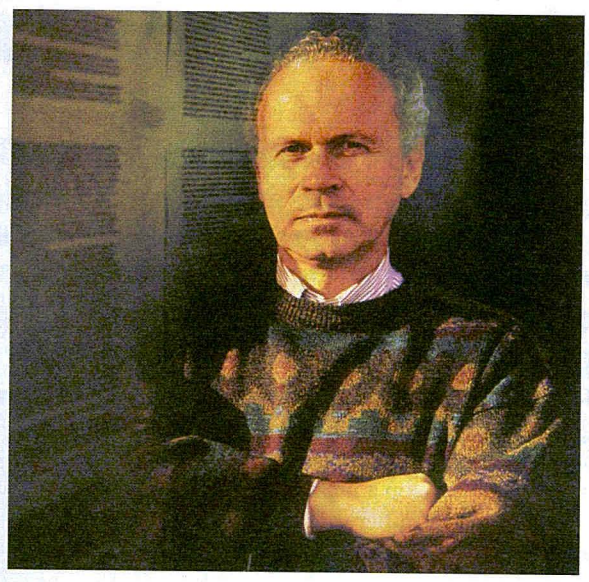


*President* **Larry Spelhaug** *in Pages' Hall of Documents*

# Pages' Big Gamble

DEVELOPER

OF ALL THE THIRD-PARTY SOFTWARE COMPANIES TARGETING THE NEXT platform, probably none has more riding on it than Pages Software, the San Diego start-up with a fundamentally new idea in document creation and design.

Most other NeXT developers are either small-stakes players taking a flyer or multiplatform publishers covering a side bet. With 23 employees and $3.5 million in venture capital, Pages has the size and funding of a full-fledged software start-up. And it has placed all its chips squarely behind NeXT.

"We can be NeXT's Aldus," says President Larry Spelhaug, who came to Pages from the real Aldus. "Macs sold because of PageMaker. NeXTSTEP will sell because of Pages."

That's not just bravado. By packaging the expertise of graphic designers for use by nonartists, Pages represents a brand-new approach for creating business documents. The question is whether the NeXT market can sustain a large organization and sophisticated product. Now, with Pages by Pages ready to ship after three years of development, Spelhaug and company are about to find out.

The concept behind this innovative product dates back 15 years, to when Vic Spindler, a New York graphic artist, began playing with the notion of "a software program that could do for design what Gutenberg did for type." Of course, this was long before the inception of desktop publishing, when the state of computer tools for graphic design was limited at best.

During the 1980s, Spindler hooked up with Mike Parker, a veteran of the electronic-publishing industry who, among other accomplishments, was one of the founders of Bitstream, the electronic-type foundry. Spindler and Parker took the idea to a variety of established software publishers but found none ready to take a risk on an unproven concept.

In June 1990, Parker divested his interest in Bitstream and put up the seed money to launch a company with Spindler. While the two founders fleshed out the concept by analyzing thousands of documents and breaking them down into standard, repeatable elements, they brought in Bruce Webster to head up development.

Webster, the well-known author of *The NeXT Book*, knew that NeXTSTEP was the perfect environment for prototyping and developing the product. He was not as certain, though, that NeXT would be the right platform on which to release it.

Early development went quickly. Webster laid out a user interface governing the application of document elements, while ☞ PAGE 18

PHOTOGRAPH BY STUART WATSON

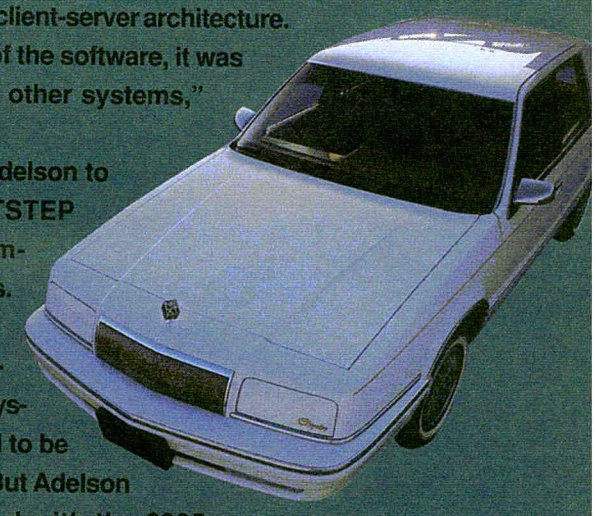
# '486 Under the Hood

IN THE TRENCHES

**NeXT workstations were never in the running for the computer overhaul at 100 branch offices that Chrysler Financial began researching in early 1991. The Chrysler subsidiary's budget was simply too tight; corporate policy dictated that only commodity-priced '486 machines would be purchased. But software was another matter: The programming job was basically up for grabs.**

**After months of evaluating over 20 vendor offerings, PowerBuilder under Microsoft Windows looked like the early winner. Test development was already under way at the company's Southfield, Michigan, headquarters. Then a corporate planner who oversaw the only two NeXT machines at the larger corporation suggested the financial team give NeXTSTEP '486 a spin.**

**That turned out to be a wise idea. Mike Adelson, the branch automation and retail systems project manager who would eventually spearhead a project involving 2500 copies of NeXTSTEP '486 – the largest-ever commitment to object-oriented system software by a single organization – was skeptical at first. He figured the best thing he would get out of NeXT's sales visit would be some free training in client-server architecture. "But the more we saw of the software, it was filling holes we saw in other systems," says Adelson.**



**It wasn't easy for Adelson to see more, since NeXTSTEP wasn't among the company's standard options. When he hosted a NeXT class at Chrysler's corporate MIS offices, the mysterious black boxes had to be taken in the back door. But Adelson liked the tools bundled with the $995 list-priced NeXTSTEP, especially the TCP/IP software and e-mail; he liked NeXTSTEP's power; and he liked NeXT's tenacity. NeXT gave Chrysler a nearly full-time technician and "a few machines to work with at no obligation," says Adelson.**

**Before long, Chrysler Financial higher-ups were compelled to admit that they had hit on a reasonable way to turn off-the-shelf '486 machines into a custom, client-server network. The deal was signed last fall.**

**Custom NeXTSTEP '486 development at Chrysler Financial will begin with a retail application for the branch offices. The contract you sign when you buy a Chrysler LeBaron will run under NeXTSTEP. So will the maintenance of that contract; NeXTSTEP will calculate and track your monthly payments, for example.**

**When the pilot branches come on-line in June, according to NeXTSTEP consultant Joe Barello, each will have** ☞ PAGE 13

PHOTOGRAPH BY DAVID MAGNUSSON

## TEN MOST WANTED

Last issue's Number 1, 1993 Expo information, went in the bag as the magazine went to press. Several from this edition could be history by the time NeXTWORLD Expo comes off at the end of May.

| RANK | LAST TIME | ISSUES ON LIST | ITEM | COMMENT |
|---|---|---|---|---|
| 1 | 3 | 2 | Early '486 shipment | Choice of hardware |
| 2 | 5 | 4 | NeXT management stability | The exodus continues |
| 3 | 7 | 5 | Expanded marketing message | MCCA getting lonely |
| 4 | 6 | 6 | NeXTSTEP notebook | Will it work with 640 by 480? |
| 5 | 2 | 2 | NeXTSTEP 3.1 | People are coping |
| 6 | 10 | 3 | Major industry alliance(s) | HP, Sun, or DEC |
| 7 | 4 | 6 | RISC workstation | NeXT hardware forever |
| 8 | 8 | 6 | Group-project management | For custom developers |
| 9 | 9 | 3 | Object-management standard | Extend lead over Microsoft |
| 10 | – | 5 | World-class video | Full screen, full motion |

ILLUSTRATIONS BY GORDON STUDER

## NEW IN SHRINKWRAP

NOVEMBER 1 TO JANUARY 1

### CONNECTIVITY/COMMUNICATIONS AND EMULATION

EXECUTOR 1.2.1
Integrates Mac software
ARDI
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### DATABASE AND INFORMATION MANAGEMENT

DAYTRIPPER
Personal and group scheduling
MIDIapolis Systems
612/822-1604

FRONT DESK
Integrated messaging system
Integrity Solutions
612/223-8474

MESA 1.3
Spreadsheet
Athena Design
617/734-6372

QUICKBASE-SQL
SQL database server
SofDesign Solutions
203/629-0970

VERSANT ODBMS
Object-oriented database
Versant Object Technology
415/329-7500

### MATH/SCIENCE

MATHEMATICA 2.1
Numeric, symbolic, and graphical computation
Wolfram Research
217/398-0700

### PUBLISHING AND GRAPHICS

ARTBURSTS: BACKGROUNDS
Screen, presentation, brochure, and overhead backgrounds
ARTBURSTS: BORDERS & BOXES
Frames, boxes, borders, and frame-object images
ARTBURSTS: DESIGNS
Decorative swirls, diamonds, and banner images
ARTBURSTS: ICONS+
Over 4000 TIFF icons
MIDIapolis Systems
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☞ PAGE 12

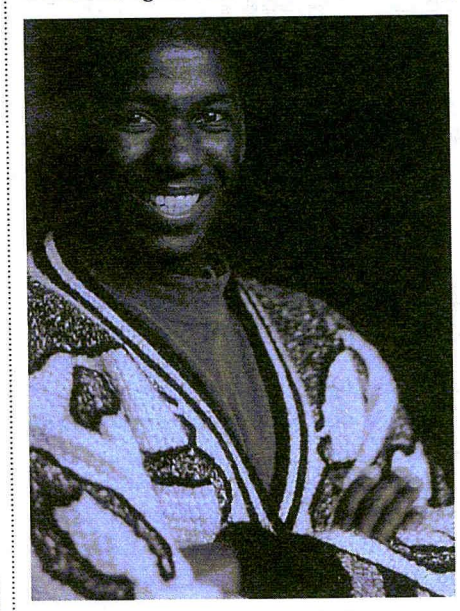
# Great Expectations

COMMENTARY

I'M AS COMMITTED AS ANY OTHER NEXT ENTHUSIAST TO THE PROSPERITY OF the platform. Before the euphoria of NeXTSTEP '486 takes hold, however, I'd like to raise a concern: Will it differ enough, in a technical and marketing sense, from the NeXTSTEP of the past three years? If industry-wide success is eluding NeXT because of inconsistent marketing and old questions about viability, these problems will be more acute on the Intel platform. Microsoft has established standards against which NeXT will now be compared.

NeXTSTEP's ability to stand up to Microsoft's Windows NT, as well as IBM's OS/2, Novell's UNIX, and Taligent's forthcoming OS, will rest on NeXT's effectiveness at educating buyers and selling its uniqueness. NeXT and its vendors must develop a marketing scheme aimed at handling the Intel platform as a whole rather than a sum of its parts. And it must have money behind it and happen well in advance of the introduction of NeXTSTEP '486.

There are real questions about the quality of NeXT products. Most observers agree that while the technology has continued to advance, it may no longer be significantly superior to competing environments. For the most part, NeXT developers have not benefited from one-upmanship among competing products, as they have often shipped buggy programs that are lacking in key features. NeXT buyers have tolerated this situation because they know that most of the developers are shipping products for the first time and lack the resources for adequate beta testing.



**Stephan Adams** *is president of Adamation.*

Then there is the matter of distribution. NeXT's current plan to continue limited distribution to integrators, VARs, and small dealers will hinder its success in the '486 market; hands-on demos of any popular PC OS and application can be had at most stores that resell computer-related products.

Potential NeXTSTEP '486 customers will also consider the support that NeXTSTEP developers can offer. Enthusiasts have settled for limited training and support from NeXT, its vendors, and resellers. This attitude on the part of customers will not endure in the Intel market, which has an abundance of such resources.

Regardless of NeXT's ability to raise sufficient capital to launch NeXTSTEP '486 as a viable OS, third-party developers will have a hard time financing the positioning of their products against applications put out by industry leaders such as Microsoft, Lotus, WordPerfect, Informix, Borland, Aldus, Adobe, and Quark. Very few of the NeXT companies can count an annual revenue of more than $2 million. And the funding community has proven bearish on NeXT vendors.

One repercussion of undercapitalization may be that NeXT's core developers are nudged out of the NeXT market or absorbed by well-funded PC companies waiting to migrate to the NeXT platform. Or they may suffer from indigestion: too much too soon. If NeXTSTEP '486 does well, most NeXT developers will have trouble supporting a user base that could grow from 2000 to 10,000 in a couple of fiscal quarters.

Finally, self-promotion will be a daunting task. Advertising and exhibit space in the NeXT-specific market is expensive enough. To make an impact in broader-based PC magazines and trade shows

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PHOTOGRAPH BY STUART W

# Vivid

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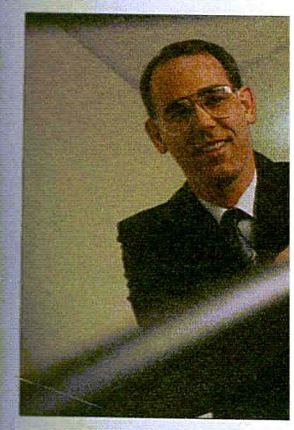

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PHOTOGRAPH BY BILL SCHWAB



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# Vivid Imagination

EMERGING MARKET

**When David Gregory was contacted by headhunters looking for someone to head the IBM/Apple joint venture Kalieda, he took just one look at the job description before declining.**

**"That person isn't going to be in the trenches doing the creative work. They're going be busy worrying about whether the employees will wear jeans or suits to work," says Gregory, a former professor of music who left academia behind to form his own company, Imagine Multimedia.**

*Imagine's* **David Gregory** *banks on multimedia.*

**Not that sticking with Imagine – or NeXT – has been very easy. After what Gregory has seen, it has required a good imagination to continue to have faith. As the oldest registered NeXT third-party software developer, Imagine has watched NeXT drop the multimedia ball on more than one occasion and other computers, like Silicon Graphics' IRIS Indigo, steal some of NeXT's multimedia thunder.**

**But Gregory's perseverance is about to pay off. In January, the company formalized a partnership with compact-disc-maker Philips Consumer Electronics aimed at developing a complete solution for delivering multimedia content on CD-I (compact disc-interactive). Using a new product called Calisto, which is scheduled to ship this year, NeXTSTEP users will be able to put together interactive presentations simply by dragging and dropping icons that represent different types of media into a presentation window.**

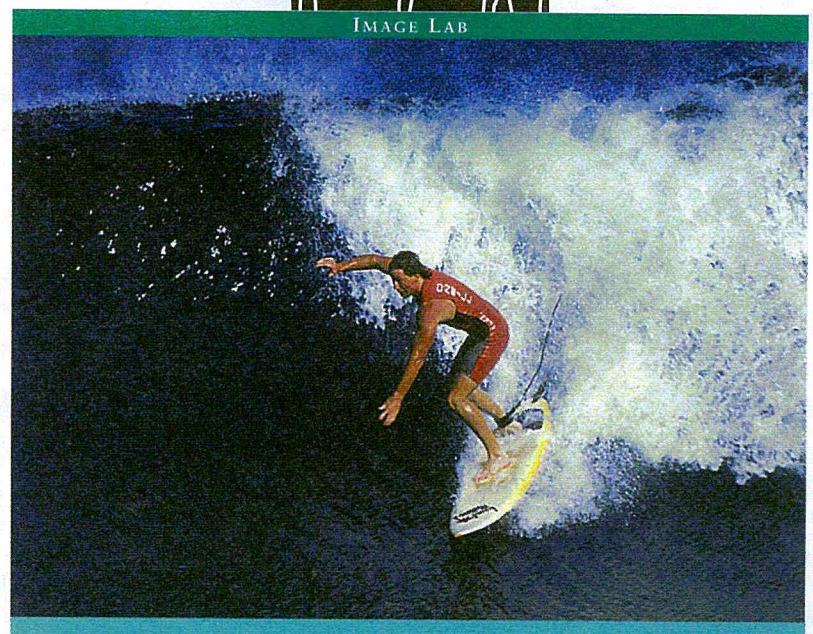
**The most basic of three versions developed for the NeXT allows for output to videotape; Calisto Author is more interactive; Calisto for CD-I adds the CD-I technology.**

**Gregory's search for the perfect multimedia computer began in the mid-1980s at the University of Michigan, where he taught music and founded the school's Center for Performing Arts and Technology.**

**He was initially attracted to the Macintosh. "Apple has historically had the reputation of appealing to more adventurous, creative types," says Gregory. "We were digitizing video with an Apple II back in 1981, before there even was an IBM PC. Once you actually started to do creative work, you began to run up against the limitations of the hardware. In the real world, when you are doing presentations or performance art, you don't want to be limited to a 20-second blip."**

**Frustrated, he turned to workstations from Sun and IBM but soon discovered they had limitations of their own. "They solved some problems with virtual memory, larger disks, good color resolution, and good quality imaging," he recalls. "The short side was you had a lousy GUI and no commercial software that compared in the least to VideoWorks or Performer."**

IMAGE LAB



Lt. Sullivan caught up with William Parkhurst, formerly one of NeXT's top software engineers, on the beach at Hale'iwa on the north shore of Oahu. While working on developing an ObjectWare company, he has time to experience the world-famous Backdoor Pipeline surf break.

PHOTOGRAPH BY BILL ROMERHAUS

**NeXT machines, being neither workstations nor PCs but combining the best features of both, were the answer Gregory had been looking for.**

**Since 1989, Imagine has concentrated on creating tools that make it easy to combine text, graphics, images, video, animation, and sound. MediaStation, the first product released by the company, provided NeXT users in academia with a sorely needed system for acquiring, cataloging, and storing all types of media. MediaStation's facility with video, in particular, made it the NeXT's first true authoring environment.**

**Gregory thinks multimedia can be a practical business tool and an essential part of NeXT's thrust into the *Fortune 1000*. "Multimedia will become a billion-dollar market when it becomes a business tool that is as accepted as desktop publishing," he says.**

**And it looks likes Imagine will now have the resources to stay at the forefront of that market. The Philips CD-I agreement coincided with a joint capital investment announced in January by Philips's investment arm, Philips Venture Capital, B.V., of The Netherlands, and the Enterprise Development Fund of Ann Arbor, Michigan.**

**The time may be right for Gregory's mission. His commitment to creativity for its own sake – to "putting tools in the hands of artists," as he describes it – appears to make business sense as well.**

*by* LEE SHERMAN

PHOTOGRAPH BY STUART WATSON

PHOTOGRAPH BY BILL SCHWAB

# Where in the World is ...

## the Corporate connection at EXPO '93?

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# Graphics in Store

ENTREPRENEURS

THERE ARE VERY FEW PLACES WHERE THE AVERAGE PERSON CAN WALK IN OFF THE STREET and test drive a NeXT; company executives in Redwood City still can't picture an in vidual user writing out a personal check and carrying home a machine.

But that's just what's happening in San Francisco at MACadam Computers, a med um-sized computer dealer in the city's growing South of Market district. The shop, wh started out as a Macintosh value-added reseller nearly four years ago, draws its cus- tomers from the ranks of artists and multimedia programmers who have settled near in an area known as Multimedia Gulch.

The idea to sell NeXT hardware and software in a storefront setting, complete w the requisite number of professionals and a couple of friendly dogs, belongs to two p ple – owner Tom Santos and salesm Hal Fox-Palmer – who are convince that NeXT sales will burgeon in th coming years.

**Santos and Fox-Palmer** *of MACadam Computers*

Santos has been around the micr computer industry since the earliest d of the Macintosh. He purchased his fi NeXT system three years ago and m his first overtures about becoming a authorized NeXT dealer in a matter months.

At first, "They told us we were the wrong market, and that it woul be a long time before we sold our fi machine," Santos remembers. "Bac then, NeXT still believed that most their systems would be sold throug Businessland" – an assumption tha would turn out to be ill-founded. The would-be giant retailer failed spectacularly, pro ing MACadam with the opening it needed to approach NeXT again. "We resumed ou talks in December 1991 and became an authorized dealer in April 1992," Santos repo

MACadam sold its first NeXT to a customer who walked into the store less tha two weeks later, according to Fox-Palmer. Now, while the sales of Macintosh periph als, software, and customized systems continue to pay MACadam's monthly rent, s of black hardware are rising steadily.

More important, according to MACadam's owner, is that the store is filling a p ously unaddressed need: It's a place where people who want to explore the NeXT c sit down and use the machines without feeling pressured to buy.

The idea has caught on particularly well since last spring. "We've had people c from San Diego, catch a plane, and come into the store," says Santos. "We had one tomer get off a plane from Germany and buy a system." According to Fox-Palmer, learned that if someone came in and spent 20 minutes with the NeXT, their love aff with the Mac was over."

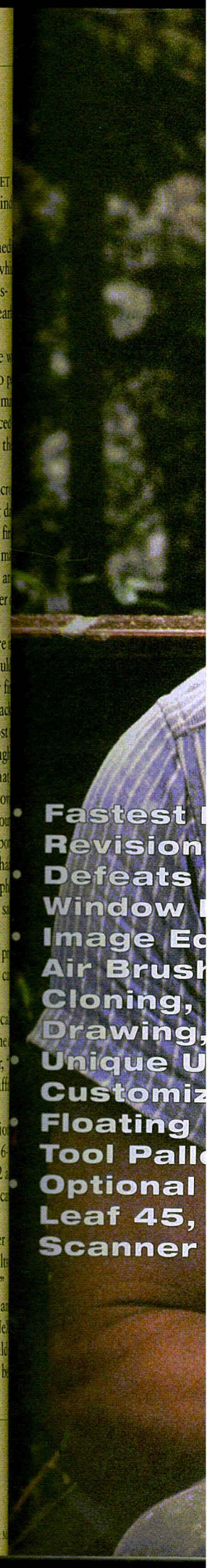
Of course the machine doesn't always sell itself. The team at MACadam cautio that the Mac's proliferation and the availability of inexpensive 50MHz Intel 80486- based workstations running software such as Microsoft's Windows or IBM's OS/2 new levels of complexity to NeXT sales. "Most walk-in customers need to be educ about the benefits of a NeXT workstation," says Santos.

But some of the new applications are helping with hardware sales, Fox-Palmer notes. "We're beginning to sell systems to local graphic artists who want to run Alt Virtuoso. That's good for us, since our store is within blocks of about 200 artists."

MACadam's future in the NeXT market looks like it might be bright. Santos a Fox-Palmer figure they are poised to catch and ride NeXT's big wave for 1993: Ne STEP '486. In fact, Santos expects the '486 environment to do so well that he coul day be selling more software than hardware. The only constants, he believes, will b NeXT – and the foot traffic.

*by* JIM FORBES

PHOTOGRAPH BY ERIC M



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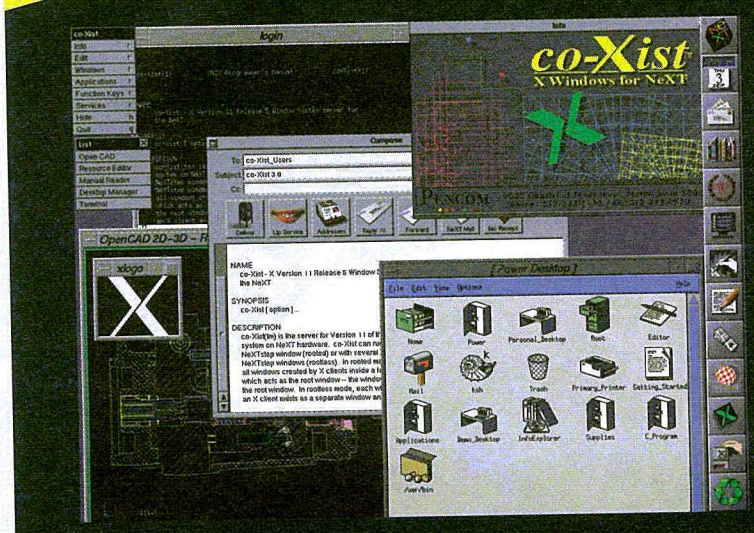


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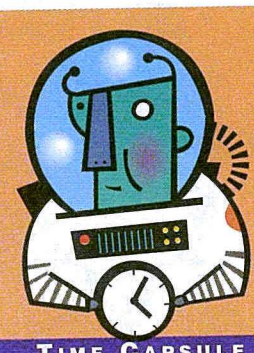

TIME CAPSULE

## Where are they now?

One way to look at NeXT's revolving executive door is that it represents a brain drain of the company's best and brightest. Another is that NeXT is seeding the computer industry with executives sympathetic to its cause.

| Name | Position and years at NeXT | Current company and title |
|---|---|---|
| * Danl Lewin | VP, Marketing, 1985–Feb. 1990 | VP, Sales, Kaleida Labs |
| * Susan Kelly-Barnes | CFO, 1985–April 1991 | Managing Director and CF Richard Blum & Associates |
| * Bud Tribble | VP, Software, 1985–June 1992 | VP, end user software, Sun Microsystems |
| Gary Moore | VP, General Counsel, 1988–July 1992 | Partner, McCutchen, Doyl Brown & Enerson |
| Max Henry | VP, Asia, 1988–July 1992 | President, JSB |
| Mike Slade | VP, Marketing, 1991–Oct. 1992 | Special Projects for Paul Allen |
| * Rich Page | VP, Hardware, 1985–Jan. 1993 | Taking time off |
| Todd Rulon-Miller | VP, Sales, 1986–Jan. 1993 | President and CEO, Software Alliance Corporation |

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415/964-1400

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What's Next?

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# What's Next?

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**NeXTWOR**

**'486 Under the Hoo**

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*by* JONATHAN LI

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*by* STEPHAN ADAMS

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### '486 Under the Hood

roughly two dozen '486 machines outfitted with NeXTSTEP, Ethernet cards, and a 48MB RAM server running Sybase with 3GB of storage. Communication to Chrysler Financial's IBM 3090 mainframes will be routed through the TCP/IP protocol and 3270 emulation.

The ambitious project, which is scheduled to be fully in place by the end of 1994, will have Chrysler Financial drawing information off its distant, COBOL mainframe database and then over to the local UNIX-based server. It isn't just the biggest NeXT or NeXTSTEP installation; company executives believe they are pushing the client-server envelope. While Chrysler Financial is only a subsidiary, it is no toddler: In 1992, it serviced $33.4 billion in car and other loans. "From what I know, this is the largest client-server project ever," says Adelson.

It will also be one of the longest technological leaps. Currently, Chrysler branch offices are outfitted with obsolete AT&T 3B2 minicomputers and dumb terminals. Branch workers can only open one window of information at a time. NeXTSTEP '486 will not only allow multiple-window operations; Chrysler Financial is convinced it will do it more easily than the competition.

The question is what longer-term implications this project may have for NeXT. Success at Chrysler could go a long way toward putting NeXTSTEP '486 on the map. It could also mean access for NeXT to other areas of Chrysler's business.

Of course, bucking tradition at the giant corporation will require more than good performance and a few back-door sales calls. But there are early indications that the rest of the company is eyeing the project closely. "They're waiting to see how it goes," says Adelson. "They're watching us." ◆

*by* JONATHAN LITTMAN

### Great Expectations

will require vastly bigger marketing budgets. It doesn't take Mathematica to figure out that NeXT and its developers will require significant capital to cultivate and maintain industry awareness in the Intel market.

With the NeXT community competing against the most entrenched software publishers in the computer industry, it's critical that a concise, coherent, and – above all – consistent plan stress the qualities only NeXTSTEP can boast: an environment capable of developing and deploying custom applications as easily as it runs packaged software. This combination is NeXT's distinguishing advantage. ◆

*by* STEPHAN ADAMS


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# Peace Dividend

NeXT services

In 1989, a top-secret client of defense contractor RDR made inquiries about NeXT computers; the client had a NeXT project underway and needed help writing custom applications. As luck would have it, RDR had just hired Chris Walters, who had enough experience with NeXTs to set up a small group of programmers – and help push the company in a lucrative new direction.

RDR has since identified a tactical opportunity in the shortage of qualified programmers versed in Objective-C and NeXT's AppKit. The firm's expertise, and now a couple of its own products, are benefiting many of the government agencies and private firms turning to NeXTSTEP for mission-critical custom applications. RDR recently signed a contract to design the retirement system for the city of Baltimore. It is also helping the consulting firm DCM, which is running Earl Williams's gubernatorial campaign in the state of Virginia.

RDR started as a small security consulting group in 1986, when its founder, Colonel Cal Sasai, retired from the military after 26 years of active service. Sasai drew upon his military credentials – including time spent with the Army's elite Delta Force – and was soon winning contracts to conduct field-training exercises and help the Army manage its computer systems. The company, which is headquartered less than 15 minutes from the Pentagon, in Fairfax, Virginia, quickly grew to about 100 people.

The company's decision to pursue the NeXT market came two years into Chris Walters's project, on December 4, 1991, when NeXT hosted a show for government customers. Sasai realized that the NeXT marketplace was about to explode with opportunity: It was the ideal time to get involved in product development. A few days later, he created RDR's advanced technology solutions group, with Walters as technical head. Walters sold RDR the rights for a set of InterfaceBuilder palettes he had been working on, and the company started marketing them in January 1992 at the first NeXTWORLD Expo. RDR also began aggressively pursuing contracting and train-

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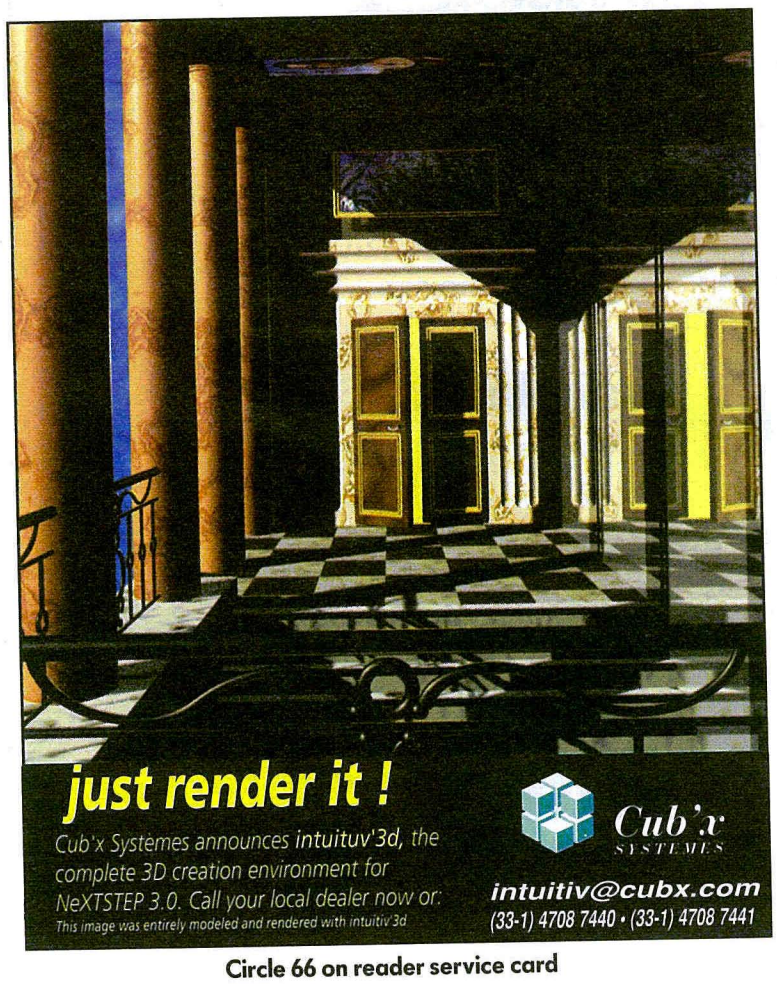


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ing opportunities in the NeXT community – and succeeding well.

"A lot of people have been burned by systems integrators," explains Robert Ward, the company's vice-president. RDR's solution is to use NeXTSTEP's rapid development environment to deliver working prototypes of applications "within six to twelve weeks" of signing a contract, he says, letting customers "drive before they buy." On a typical $500,000 contract to develop a custom application, the customer commits $50,000 up front.

A few months later "we give them an application they can try," says Ward. The customer then has the choice of canceling the contract or letting RDR finish the work and paying the contract's face value. So far, says Ward, nobody has ever opted to cancel a project.

RDR is getting aggressive with products as well. The company has polished up a presentation program called @image that Walters developed with two friends several years ago while moonlighting. The software, originally called NeXT Question, was put on the back burner when Lighthouse Design's Concurrence came on the scene. While @image doesn't provide the outlining capabilities of Concurrence, it costs less than half as much.

Meanwhile, RDR has taken NeXT's Developer Camp model one better: This spring, the company is opening the doors of its own "NeXT University." In addition to being an authorized provider of NeXT courses for users, developers, and system administrators, RDR will be offering introductory classes in UNIX, Objective-C, and most NeXTSTEP productivity applications.

Colonel Sasai is convinced that the flurry of NeXT-related activity at his company won't die down anytime soon. "NeXT is new," Sasai says enthusiastically, so RDR can make a name for itself in this market – and grow with it.

*by* SIMSON L. GARFINKEL


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# Camera Shy

ON THE NET

When you see a posting on the Net with the subject "Re: nextstep" and it isn't referring to a certain Redwood City–based company's operating software, you know something interesting is up. In this case, it's the latest in a long series of NeXT and NeXT-related sightings that have amazed, intrigued, and frustrated Net readers, who are baffled by NeXT's failure to take better advantage of these mentions.

Sightings have been confirmed in such diverse media as a Paula Abdul MTV video; a TDK television commercial; a network series (the now-defunct "PS – ILUVU"); several major motion pictures, including "Flatliners"; and various CNN "Headline News" stories, including a report from a weather center during a hurricane.

But the "Re: nextstep" thread is particularly amusing (and frustrating) because it refers to "the next step," a new San Francisco–based technology-of-the-future television series currently running on the Discovery Channel. Despite having a name, look, and logo similar to NeXT's (including a spinning square at an angle with a NeXT-HQ-like staircase superimposed), the show has never reported on its namesake, NeXTSTEP, certainly one of the most interesting new technologies in the computer industry.

This lapse would be worth protesting if NeXT had ever made a serious effort to penetrate the national media. Many of the sightings on the Net are by non-NeXT people who get excited enough just by the look of the hardware and its apparent functionality to join NeXT Net news groups and sometimes even purchase hardware. Imagine the level of interest if NeXT actually tried to be seen. They could start by pushing for a segment on "the next step" (it's in San Francisco, after all); actively seek higher visibility in the mass media; and, finally, create some killer commercials. NeXT has no excuse for not doing this in 1993. But then again, NeXT had no excuse for not doing this in 1992.

*by* CHARLES PERKINS


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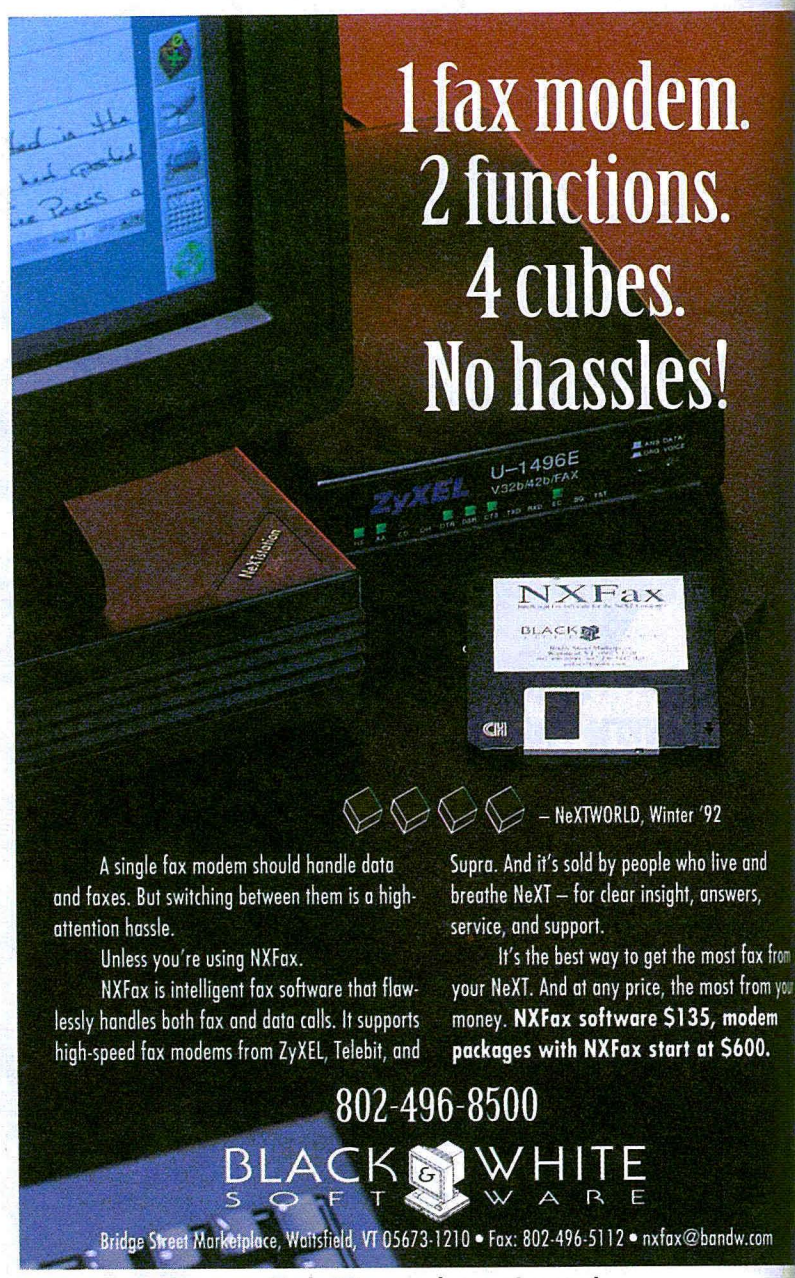


– NeXTWORLD, Winter '92

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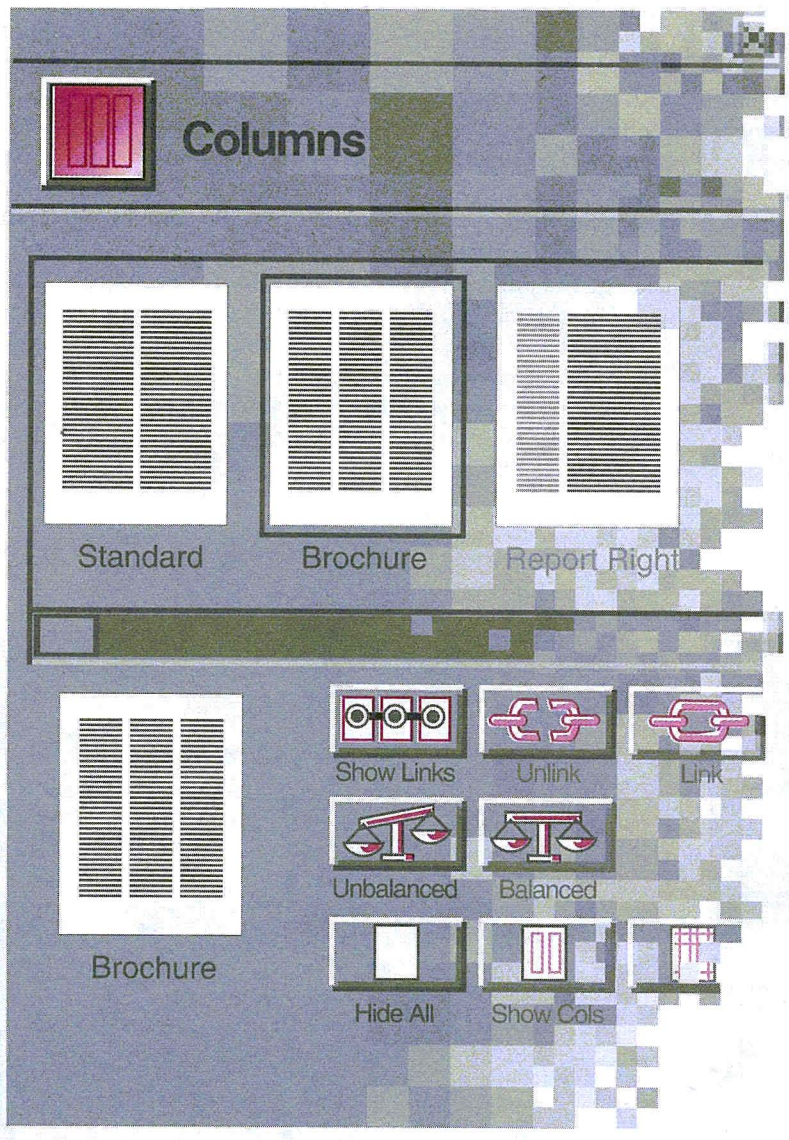



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### ☞ Pages' Big Gamble

Spindler and Parker worked on the companion design models. Webster demonstrated the prototype to Steve Jobs, who loved what he saw: a potential breakthrough application that could differentiate NeXT in the publishing arena.

In March 1991, the company demonstrated Pages publicly at a Seybold conference, where it received a great deal of attention. In December, Paragon Venture Partners took the lead among several blue-chip venture firms in backing Pages to the tune of $3.5 million. One of the conditions for funding was that the company hire an experienced software executive to run the company.

Enter Spelhaug, a computer-industry executive with 25 years of expertise in computer-based publishing. Among his career highlights, Spelhaug directed Xerox's entry into the desktop-publishing market with Ventura Publisher and later ran marketing for Aldus Corporation, the leading publisher of graphic-design software for desktop computers.

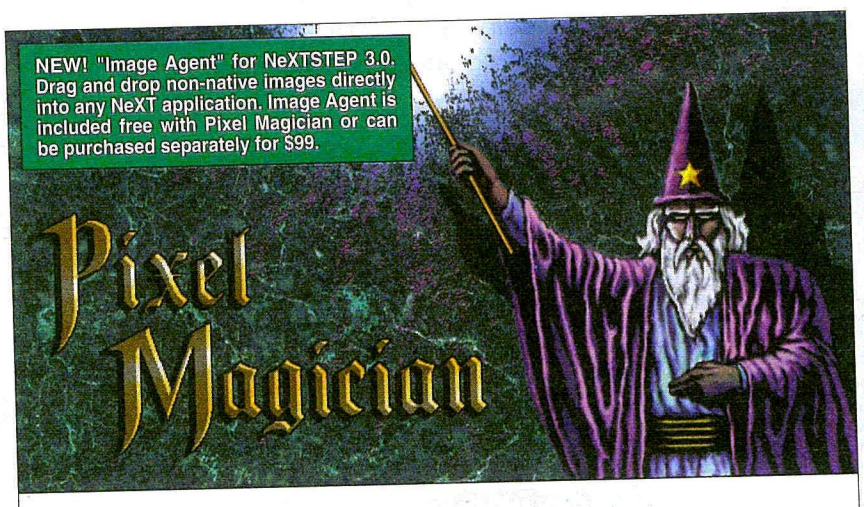
Knowing that he had a good product, Spelhaug set out to build a strong company. He quickly added Rand Schulman from Island Graphics to run sales and marketing; Jim Hamerly from Xerox to manage R&D; John Curry from Chipsoft to control finances; and Dave Krich from Claris to establish testing and quality-assurance programs. He also clarified the roles for Spindler as product manager; Parker as director of design models; and Webster as chief architect.

"This is not a couple of guys in a garage, but an exceptionally experienced team," Spelhaug says. "This is a structure scaled to support a $20 million business."

But it is also a gamble that the NeXT installed base can support such a large operation. Spelhaug says that NeXT was the right bet for Pages, since it provides a chance to establish a dominant market share on a technologically advanced platform. By defining the product as general-purpose document-creation software for writing, designing, presenting, and publishing, Pages has a chance to capture the broad mainstream of the market. With sufficient penetration and sufficient success for NeXTSTEP '486, Spelhaug is confident that Pages can live up to its business plan.

Down the road, the company foresees possible ports to other platforms – certainly Windows NT looms large. But that's a wager for another day; first Pages has to collect on its NeXT gamble. The wheel is spinning.

*by* DAN RUBY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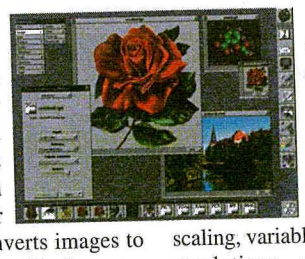

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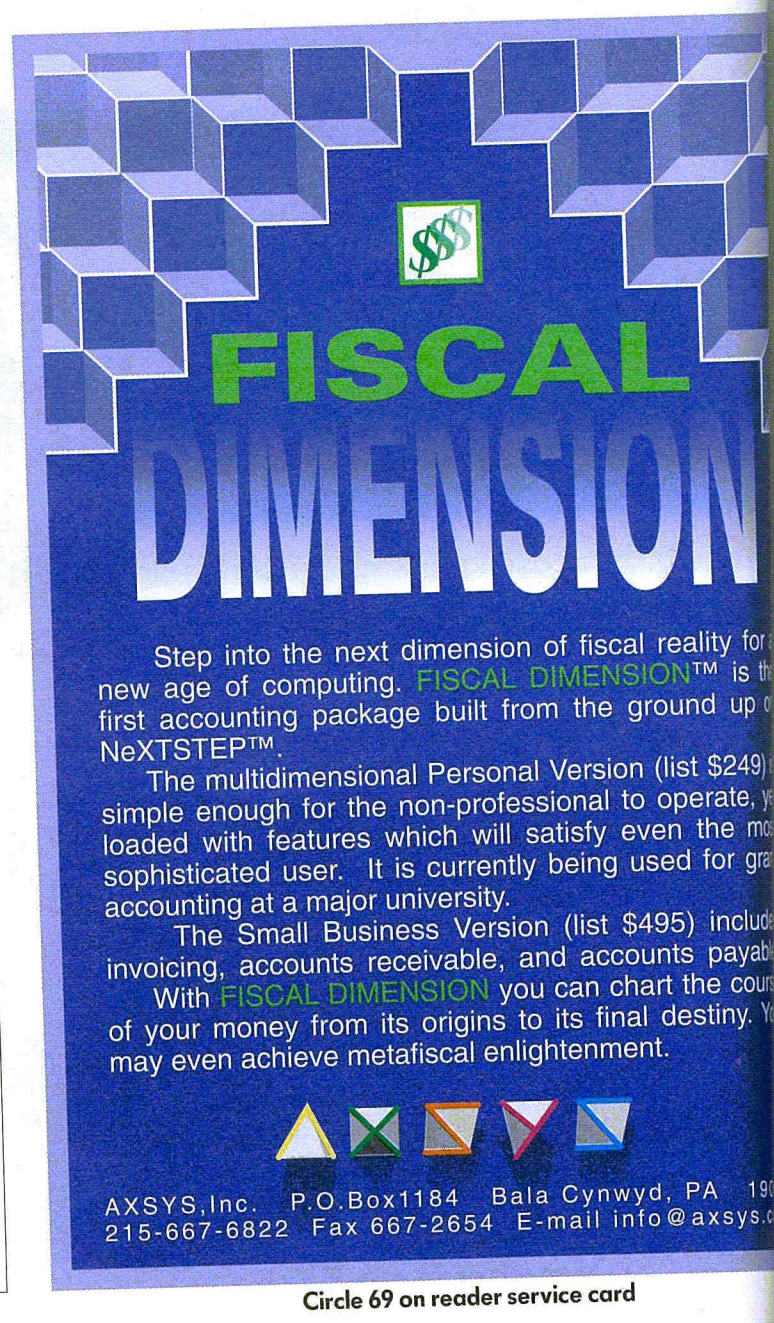


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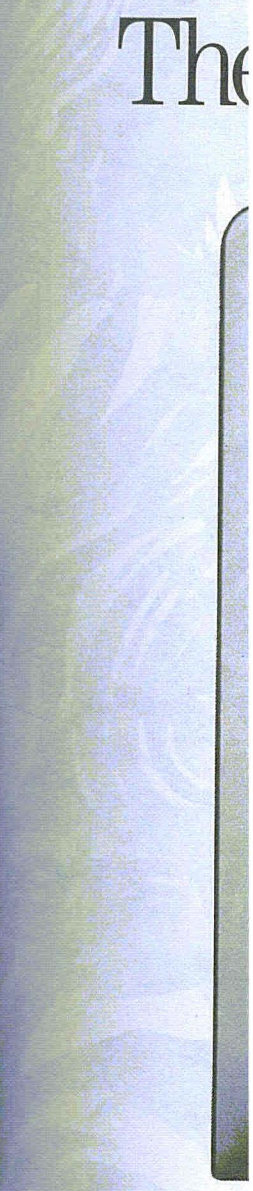





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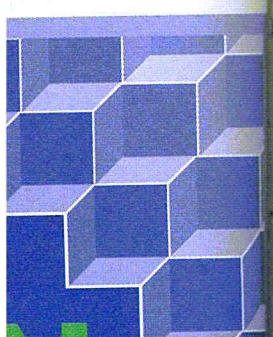


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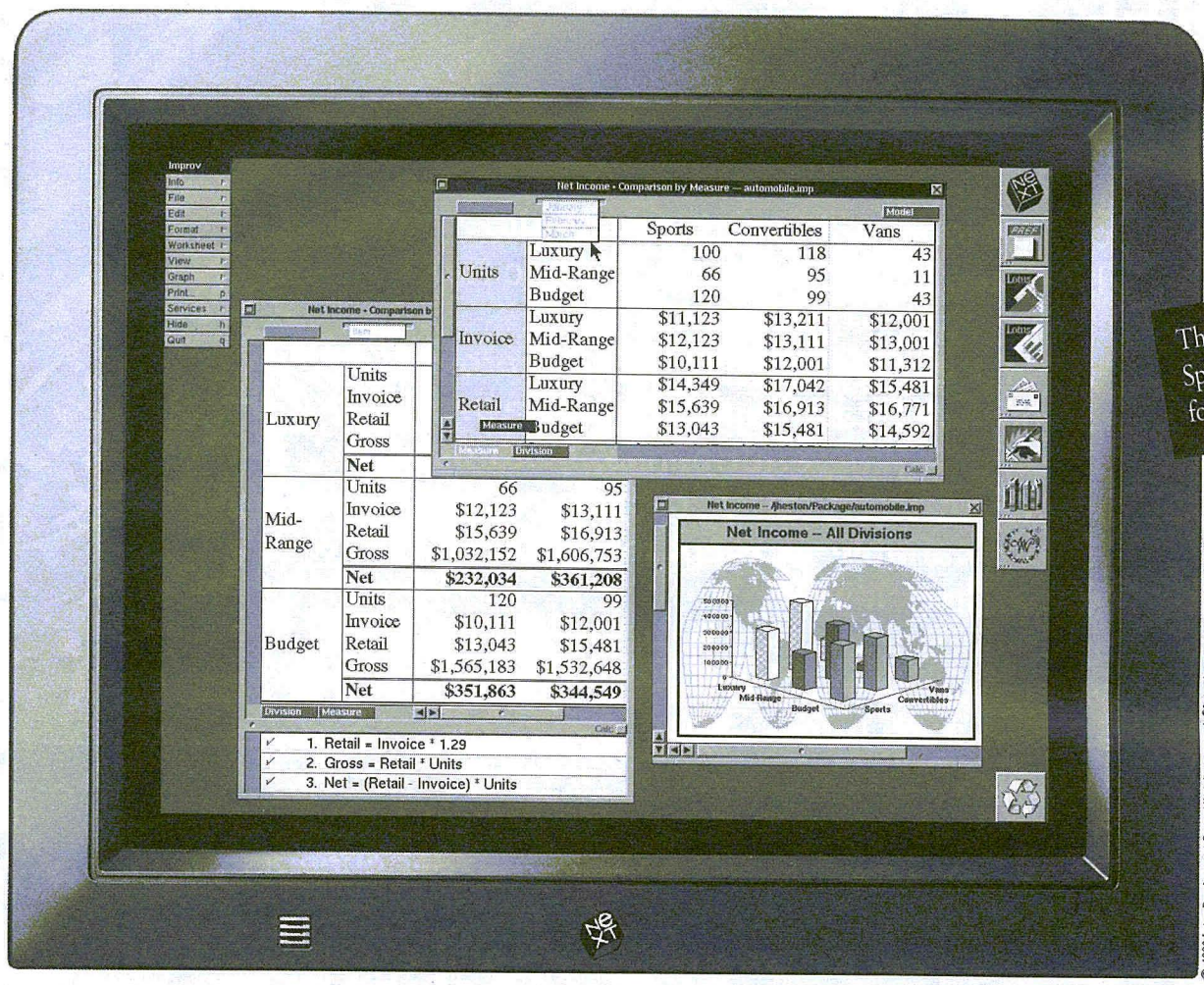


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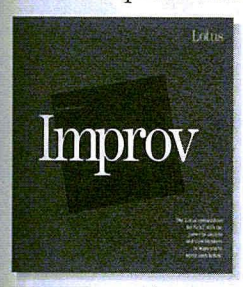



*"...Improv knocked me out. It's the first new program that I've seen in months. Lotus's designs are truly innovative."* —BYTE Magazine, 10/90

*"A stunningly simple approach to organizing complex data."* —PC World, 11/90

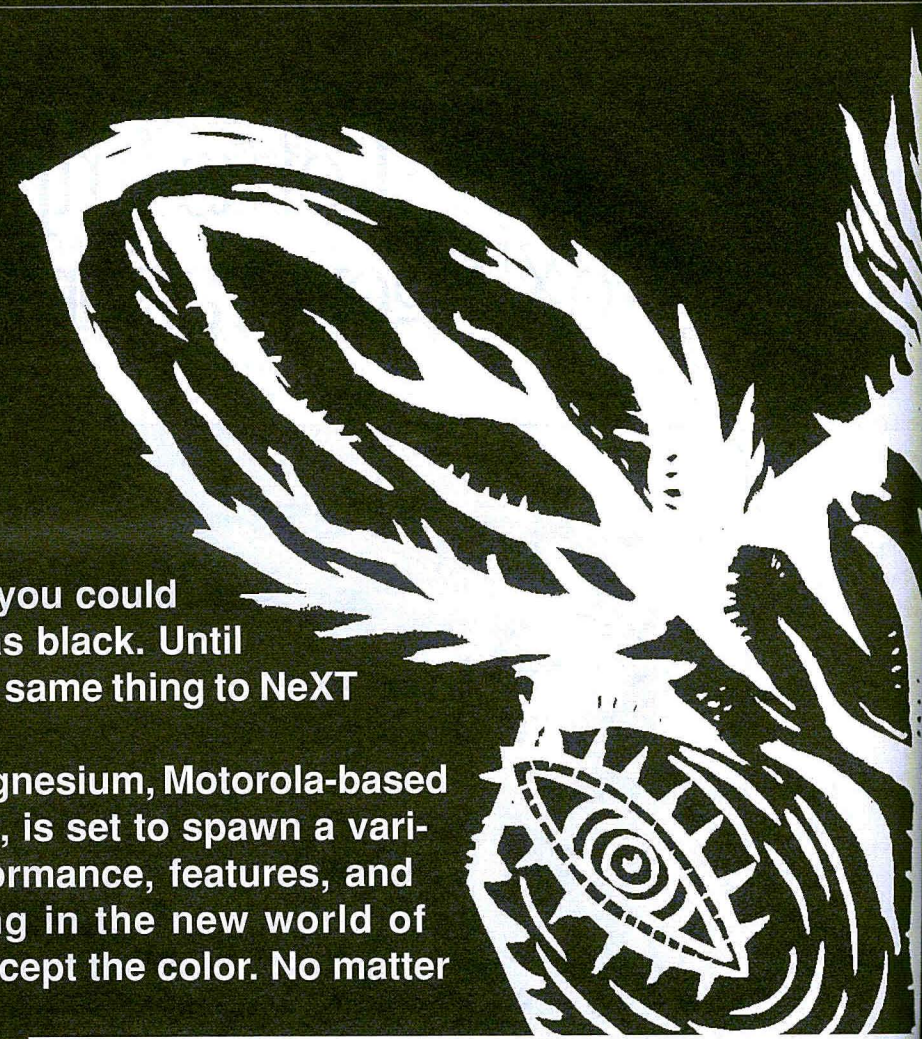
*"Improv is one of the most interesting applications I've seen in quite some time. It's a totally different take on the spreadsheet."* —Info World, 11/1/90

## *Lotus Improv for the NeXT Computer.*

**Circle 50 on reader service card**

# You get your choice of performance and price with white hardware. Underneath, it's all NeXTSTEP

*by Dan Lavin*




**Henry Ford said of the Model T that you could buy it in any color – as long as it was black. Until now, Steve Jobs has been saying the same thing to NeXT customers.**

**Now NeXT's Model T, the black-magnesium, Motorola-based line of NeXTcubes and NeXTstations, is set to spawn a variety of new models differing in performance, features, and price. In fact, just about everything in the new world of NeXTSTEP hardware is variable – except the color. No matter what finish is on the box, "Intel inside" computers are, by definition, white.**

**As this article went to press, NeXT was still uncertain about its future plans for black systems. What was certain – based on our tests of a midrange '486 system from Epson – was that NeXT users can count on a consistent experience as they switch from black to white hardware.**

**To find out what to expect in the brave new world of NeXTSTEP on Intel, *NeXTWORLD* tried out several Intel-based systems and installed one for a test drive in our offices. We found that the alpha NeXTSTEP software for Intel was stable and that it behaved almost identically to native NeXTSTEP. Our box was $2000 cheaper than an equivalent NeXT system, and it performed at least as well.**

## Playing catch up

**With the original NeXT machine, Steve Jobs and his cofounders had a vision of a computer that would go as far beyond the Macintosh as the Mac had gone beyond the Apple II. To provide the qualities called for by NeXT's operating-system software, NeXT required hardware well beyond the standards of desktop technology – a workstation-class machine with MegaPixel Display, scads of memory and storage, a custom "mainframe on a chip," and other hardware innovations.**



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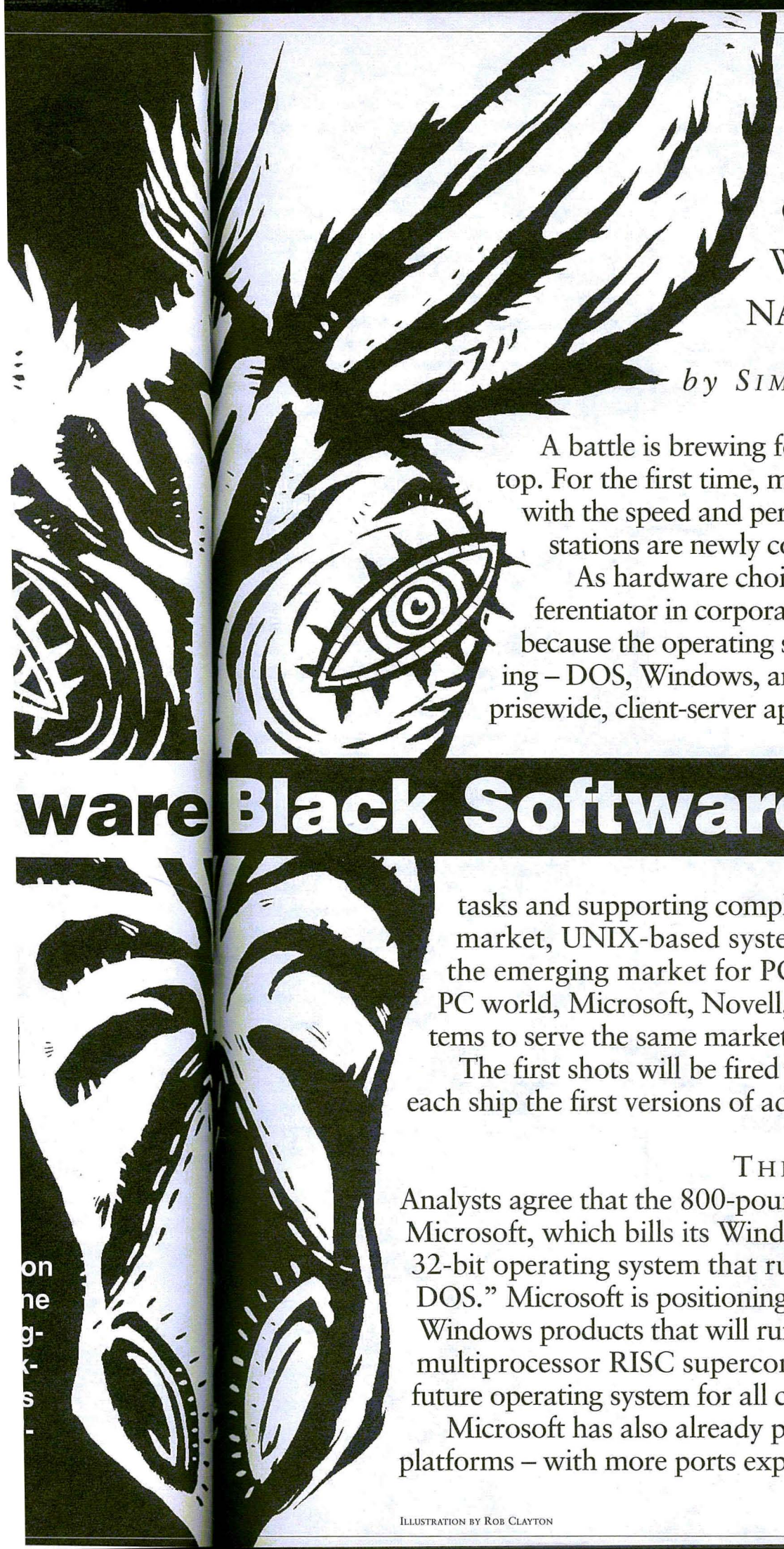


# ware Black Software

## CARVING OUT A BLACK MARKET FOR NEXTSTEP ON INTEL MEANS WRESTLING WITH AN 800-POUND GORILLA NAMED MICROSOFT

*by SIMSON L. GARFINKEL*

A battle is brewing for the mainstream business-computing desktop. For the first time, mass-market personal computers have caught up with the speed and performance of low-end workstations, while workstations are newly competitive with PCs on price.

As hardware choices become increasingly irrelevant, the key differentiator in corporate environments will be system software. That's because the operating systems that have dominated business computing – DOS, Windows, and Macintosh – are underpowered for the enterprisewide, client-server applications that corporate users are demanding.

Tapping the real power of industry-standard '486- or Pentium-based computers requires that PCs be equipped with an advanced operating system capable of managing simultaneous tasks and supporting complex networks. Coming from the workstation market, UNIX-based systems suppliers, including NeXT, have targeted the emerging market for PC-based advanced systems. Coming from the PC world, Microsoft, Novell, and Apple are evolving their operating systems to serve the same market.

The first shots will be fired this summer, as Microsoft, SunSoft, and NeXT each ship the first versions of advanced operating systems for Intel-based PCs.

### THE COMPETITION

Analysts agree that the 800-pound gorilla in the advanced-systems market is Microsoft, which bills its Windows NT as "a powerful, scalable, multitasking 32-bit operating system that runs applications for both Windows and MS-DOS." Microsoft is positioning Windows NT as part of a logical continuum of Windows products that will run on everything from low-end PCs to high-end multiprocessor RISC supercomputers. Microsoft hopes that NT will be the future operating system for all computers.

Microsoft has also already ported NT to both the MIPS and Alpha RISC platforms – with more ports expected. That means that PC users will have an

ILLUSTRATION BY ROB CLAYTON

That was in 1988. As the years passed, hardware technology in the Intel PC world caught up to NeXT's. Computers based on Intel's 80486 processor are grabbing market share from lower-powered Intel chips, while the sales volume has driven their price into the bargain basement. Seeing this trend, NeXT decided last year to make its software available to the millions of '486-machine users.

NeXT hoped to ship NeXTSTEP for Intel processors in 1992. Now it looks like a good bet for summer 1993. The holdup wasn't porting the code to the new processor; that was easy. What NeXT didn't count on was the array of different hardware products – add-on cards, video standards, bus architectures – it would have to support.

For a standard platform, Intel-based PCs are not very standard. It's really an open system, meaning that any manufacturer can make any product for it – but writing drivers for all those different configurations and add-on products can be a time-consuming chore.

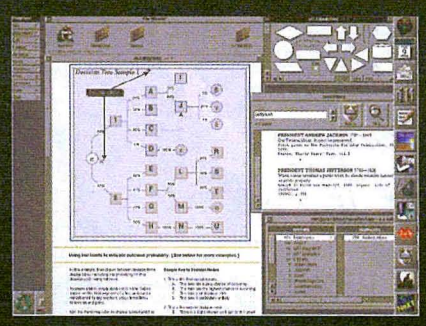
The result is that, on first shipment, NeXT will support only certain PC designs and add-on cards. While NeXT has not yet announced which PC models and configurations it will support, several manufacturers have shown preliminary versions of NeXTSTEP running on its machines in public forums. These include Epson, NEC, Intel, Goldstar, Dell, and Compaq.

For this article, we used an Epson Progression DX 33MHz with a Wingine graphics subsystem. We loaded it with 36MB of memory, a 1.44MB floppy, and a 400MB hard disk. It had 1MB of VRAM and an Epson 17-inch analog color monitor, yielding 800-by-600 resolution. It also had add-on cards for SCSI and Ethernet support.

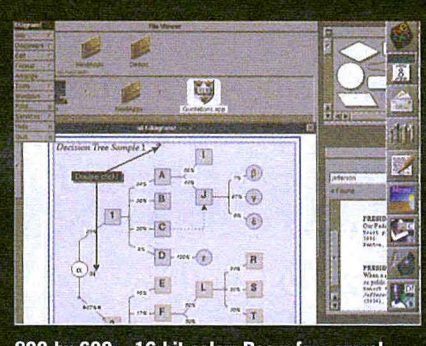
This is a fairly hot machine, but certainly not the fastest NeXTSTEP box that will be available. As configured, we estimate its retail price at $5600. An equivalent NeXTstation Color lists for $7995.

Prices will vary considerably by system. We estimate that entry-level grayscale machines will cost $1500–$2000. A fully loaded, color 1024-by-768 screamer running at 66MHz could cost $7000. That's the nice thing about white hardware: The choice is yours.

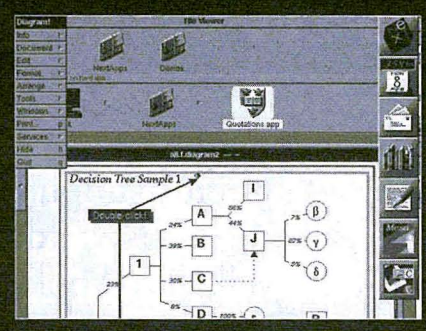
*NeXTWORLD* will publish detailed information about supported PCs and add-on products once it becomes available. In the meantime, do not go out and buy a system based on this preliminary report.



1120-by-832 resolution – 16-bit color: Lots of room for multiple, large applications.



800-by-600 – 16-bit color: Room for several things but space is tight.



640-by-480 – 2-bit color: The laptop look. One or two apps only.

## MIRROR IMAGES

NeXTSTEP for Intel is functionally identical to native NeXTSTEP 3.1. Only two important features are missing: There is no DSP (digital signal processor) chip on most PCs, and, for now, NeXT will not support DSP add-on cards. The first release will also not support on-screen video or any of the functions of the NeXTdimension video board.

Besides these differences, NeXTSTEP for Intel works just like the '040 version. All bundled applications and full Mach UNIX work right out of the box. All the system-administration tools work just as you would expect. AppleShare and Novell NetWare client support will be available. Libraries of items like fonts and sounds can be shared freely across a network of mixed black and white hardware.

You will need a '486 version of your third-party software. In most cases, developers will release "multi-architecture binaries," also known as "fat binaries." These are apps that include both black and white versions of the software. When you double-click the app, it launches the correct version. Developers need to port their software to make this work, but initial experience shows this to be no problem (see the sidebar, "Porting NeXTSTEP Programs").

The biggest difference users will discover is the wealth of configuration choices. In general, for any given category of add-ons or subsystems, NeXT says it will try to support both the market-leading and most technically advanced products.

The user's first choice will be the processor. NeXTSTEP has certified only the Intel '486 chip; it appears that clones by companies like Cyrix, or any '386 chips, will not work. Any true Intel '486 will work, including the SX, DX, DX/2, and SL variants. With SX chips, in which the floating-point function is disabled, NeXT recommends adding a coprocessor. The SL is the low-power version of the '486 used in portables (see the sidebar, " '486 Portables Will Take NeXTSTEP on the Road"). So unless you are installing NeXTSTEP on an existing machine it is best to buy DX- or DX/2-equipped machines.

The '486 processors come in a range of clock speeds. In general, faster is better, although the cost is high for systems faster than 33MHz. The fastest pure DX machines run at 50MHz, but Intel has produced versions that work at one speed internally while sending data to the rest of the system at half that speed. The 66MHz DX/2, for example, runs at 66MHz internally and 33MHz externally. It is much less expensive than a DX 50 and faster for many tasks.

Since the NeXTSTEP user interface places a big demand on a system, NeXT recommends at least a 20MHz SX machine with a coprocessor to run grayscale and at least a DX 33 to run color. Our experience showed that a 33MHz color machine ran at about the speed of a 25MHz color Slab. We recommend at least a 50MHz DX/2 chip to take you into the future.

The choices for graphics are a bit more complicated. Since NeXT uses 16-bit color while most PCs use 8-bit, standard PC graphics cards will produce only grayscale output. You can run NeXTSTEP in grayscale with VGA graphics, though SuperVGA will provide higher resolution.

To run NeXTSTEP in color, the system needs special graphics hardware. The technical requirements call for a linear frame buffer and a high-speed path to the video memory. These requirements may be met on the motherboard for an ISA (industry-standard architecture) machine or through an add-on graphics card in EISA (extended industry-standard architecture) machines.

High-performance video subsystems are built into many of the newer high-end machines that are optimized to run Windows and OS/2. Unfortunately, a true standard has yet to emerge. NeXTSTEP will be optimized to work with specific standards such as PCI, LocalBus, and VL-BUS, as well as specialized subsystems from certain manufacturers, such as the Dell/Intel JAWS or Chips and Technologies Wingine. NeXTSTEP will also support additional EISA cards such as Compaq QVision and the ATI Graphics Ultra Pro.

The amount of VRAM that ships with the machine will determine how many pixels appear on the screen. For display, you will need to choose a monitor that can handle the number of pixels you have selected. NeXT will support only noninterlaced monitors for a given resolution. In a future issue, *NeXTWORLD* will evaluate resolutions for various PC models.

NeXT's native black hardware runs at 1120 by 832 pixels. Though NeXTSTEP will run all the way down to 640 by 480 for notebooks, anything less than 800 by 600 pixels for a desktop machine greatly dimin-

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Most systems vendors concede that Microsoft will be the dominant force in the advanced-systems market; the others are jockeying for position as the leading alternative to NT. NeXTSTEP for Intel has an opportunity to assume that role because of its advantages for object-oriented development. For all of NT's strengths, it doesn't begin to provide the object tools or libraries that are already fairly mature in NeXTSTEP. That won't come for Microsoft until a follow-up version of NT, code-named Cairo, brings object orientation to the Windows world in 1994 or later.

Relying heavily on the advantages of InterfaceBuilder and the Database Kit, NeXT is being priced, marketed, and sold, not as a general-purpose operating system, but as "the best object-oriented platform for writing and deploying client-server applications," says Brett Bachman, NeXT's director of software product marketing.

Meanwhile, the other contenders have their own strengths: IBM's much-maligned OS/2 has a sizable market share in corporate environments, with more than two million copies sold; SunSoft's Solaris 2.0 for Intel brings Sun's strength among technical users to the PC market; Santa Cruz Operation (SCO) has served the Intel-based world with Xenix and UNIX systems for the past decade, with more than a million copies installed; and Novell, a company with both the money and inclination to become Microsoft's archrival, recently purchased UNIX Systems Laboratories (USL) – and UNIX itself – from AT&T.

## Window of Opportunity

Many observers feel that the market will only support one or two major operating systems. As evidence, they point to the existing market for PC operating systems: Although most PCs can run a wide range of DOS-compatible operating systems, Microsoft's DOS owns the overwhelming majority of desktops.

In the advanced-systems market, though, Microsoft may have squandered an opportunity by taking years to establish Windows as a standard graphical environment and even longer to provide multitasking and other UNIX-like features. "Microsoft took a very long time to make Windows work – seven years," says Paul Cubbage, a principal analyst at Dataquest. "They provided a wide-open window of opportunity for UNIX, and the UNIX folks have done nothing about it," Cubbage says.

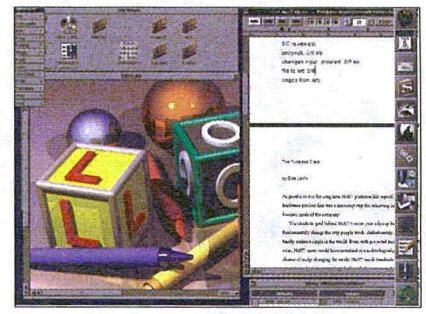
Indeed, during those seven years, the UNIX community has fought and fractured, developing at least 13 different versions of the operating system and not less than four incompatible graphical user interfaces. "There are too many different UNIXes," says Don Babcock, vice-president for Timeline, which is developing an accounting package based upon Microsoft Access, Microsoft's new database product. "UNIX can't get its act together."

So the biggest strength of Windows NT may not be its technical merits, but the fact that it comes from a single supplier, in a single version. "NT is NT is NT. You don't have different flavors of NT," says David Price, a Windows NT manager at Digital Equipment Corporation.

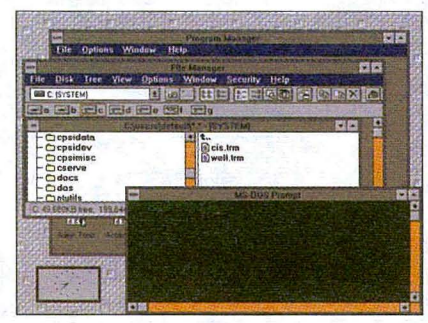
Analysts expect Microsoft to come on with NT like a steamroller. Over the past few years, Microsoft – a company that earned $2.7 billion in fiscal year 1992 – has developed an operating system that will provide a multitasking, multithreaded, protected-mode operating system with sophisticated security capabilities. It will plug and play on most networks. It will run DOS and Windows programs. And it is portable.

While Microsoft has yet to announce any pricing for Windows NT, by the end of 1992 it had seeded the world with 38,000 copies of NT and the complete development system to any consultant willing to shell out a mere $79. In so doing, Microsoft has created an army of people trained in NT to develop applications, help new installations, and write purchase orders.

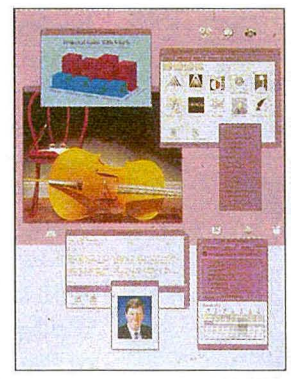
"The general marketplace is Microsoft's to lose. Microsoft has to screw up," says Cubbage.



**NeXTSTEP for Intel: Object-oriented environment eases custom development.**



**NT: Industrial-strength Windows may dominate market but lacks object orientation.**



**Solarias for Intel: Sun brings strengths in technical markets to corporate desktops.**

## Apples and Oranges?

If NeXT is worried about the competition, they're not showing it. "We are not positioning it feature-for-feature, head-to-head with NT or Solaris," says Bachman.

Instead, NeXT is selling NeXTSTEP for Intel as an object-oriented development environment and run-time system for corporate desktops. "It's a better means to develop and deploy custom applications to automate business processes," Bachman says confidently. The power of NeXTSTEP, he adds, makes it easy to integrate custom-built applications with shrinkwrapped offerings.

Rather than compare NeXTSTEP to operating systems like NT, Bachman suggests comparing NeXTSTEP with other object-oriented application-development systems such as Galaxy, from Visix Software. Galaxy costs $9600 per developer on UNIX workstations, $7800 for Windows. Such systems typically offer object-oriented development tools, text objects, color pickers – all the stuff of NeXTSTEP. Bachman maintains that when they compare NeXTSTEP with those high-priced systems, corporate developers think that NeXT is practically giving away NeXTSTEP for free.

In many ways, giving NeXTSTEP away for free is what NeXT has been doing all along – the operating system came free when you bought NeXT's proprietary hardware. It's that proprietary hardware, NeXT now believes, that has been scaring customers away. Many large companies have "PC service organizations," explains Robert E. Lawton, program manager for NeXTSTEP for Intel. "They may have six people who do nothing more than put boards in machines" and tear them apart when they break down.

NeXTSTEP for Intel lets customers focus on the added value of NeXT's software, Lawton says, without having to worry about the difficulty of installing, upgrading, and servicing NeXT hardware.

Realizing that it must make NeXTSTEP for Intel attractive for both existing NeXT users and new customers, NeXT has also gone to great pains to minimize the hassles of operating in a mixed environment.

For example, NeXT modified the UNIX file system so that floppy disks and hard drives formatted on one kind of computer can be readily moved to another. NeXT has also pioneered fat binaries for storing executable code for several different microprocessors in a single file. This lets a large site have a single **/LocalApps** directory for both its black and white hardware.

And if NeXTSTEP is ported to a high-performance RISC workstation, it will already have the hooks built into the system for incorporating RISC machines into '486-based networks.

NeXT is also banking on the ability of NeXTSTEP for Intel to run DOS and Windows programs. NeXT plans to use a special '486-based version of Software Ventures' SoftPC Professional, which should make DOS and Windows programs running on a '486 run as fast as if they were on a 386-based computer (see "Windows Dressing"). The program will intercept Windows calls and map them directly to Display PostScript, which should speed performance considerably. NeXT also plans to integrate Microsoft's DDE (Dynamic Data Exchange) and OLE (Object Linking and Embedding) into NeXTSTEP's cut-and-paste system, for "seamless" Win-

ishes the size of the workspace. We recommend spending your money here for more pixels and a high-quality monitor, much like first buying good speakers for your stereo system.

Beyond graphics, configuration is fairly simple. You'll need at least 8MB of memory for grayscale and 16MB for color, though more is better. You'll need a 120MB hard disk for the user system and 330MB for the developer system, though 200MB and 400MB, respectively, will be more comfortable. IDE-standard disks will work, but a SCSI disk is faster. This requires a SCSI card, and NeXT will support the market leaders such as Adaptec, as well as high-end suppliers such as DPT.

For connection to the network, you'll need a network card. SMC, Intel, and 3Com cards are just a few Ethernet products to be supported. Token-ring networking will also be available. Depending on the sound capabilities built into your system, a sound card and a microphone are a must for Lip Service users.

In the PC world, you will have a vast choice of keyboards. NeXTSTEP can use the standard PC layout, or you can remap the keyboard to the way the NeXT keyboard is laid out. Special functions of the NeXT keyboard, such as the Power key and sound volume, are handled in the NeXTSTEP for Intel software.

## THE SOFTWARE STORY

Depending on how you acquire your system, you will either have NeXTSTEP for Intel preloaded on your hard disk or buy it separately. Just how this will work is not yet known. The announced price is $995 for the user version and $2495 for the full developer release.

If you install it yourself, you will get a starter floppy to boot the machine, while the rest of the operating system loads from CD-ROM. (This means you will need a CD-ROM drive for this one-time operation). NeXTSTEP for Intel supports multiple disk partitions, so you can load DOS or Windows in a separate partition.

Now you have system software loaded. What about applications and data? The first piece of good news is that only executable programs need to be ported; data and text files work on both processors with ease. All data files can be shared across the network between black and white hardware, including all of your libraries and fonts, image files, and documents. As a user, you have no "porting" to do. One really nice feature is that your DOS partition is automatically mounted onto the NeXT file system, making transfer of files on a multiuse machine very easy.

More good news: NeXT's full suite of bundled applications has been ported to '486. This includes programs like Terminal, Mail, Edit, and Preferences on the user side, and InterfaceBuilder and ProjectBuilder for developers. The contents of the various libraries need no translation. Terminal scripts run without modification.

Data in a given application format can only be opened by that application if it is running on the '486. As I write this, WriteNow has not yet been ported, so to move my file, I have to save it in RTF format and then open it in Edit on the '486.

## HANDS-ON

Installing and using our Epson was as easy as could be. I unpacked the machine, plugged it in to our network, and was up and running. I was given an option to boot into DOS. I declined, and by default went directly into NeXTSTEP. Then it was just like adding a new machine to our network. I gave it a machine name, ran the standard *NeXTWORLD* configuration script, and logged on with my username. Elapsed time from closed box to desktop: 10 minutes.

At 800 by 600, the screen is crisp and the 16-bit color rich, but you can't help noticing the larger menus and icons. These screen elements are a fixed pixel size. If the screen has 800 pixels across rather than 1120, icons are proportionately larger. Standard window elements, like sliders, are larger as well. To gain back some space, you can change the font on the menus and drag the Dock off the bottom of the screen.

You can also pop for a higher-resolution video subsystem and monitor.

The keyboard remapping was a little disconcerting. NeXT users will have to adjust to either a new layout or mislabeled keys.

Third-party apps ran perfectly. We tried Concurrence and Mesa, among others, and found no appreciable difference from their native versions.

While we did not conduct formal performance tests, the speed of our DX 33 seemed comparable to a 25MHz NeXTstation; for some tasks it was faster yet. Network and printing performance were the same as for any machine on our network. The DX 50 should be substantially faster than a Turbo and a 66MHz should really scream.

The bottom line is that NeXTSTEP for Intel, even in prerelease, was rock solid when running on a machine faster and cheaper than NeXT's black hardware. The one significant drawback we found was the decreased screen real estate, but we are willing to trade that off for the access to the vast world of white hardware.

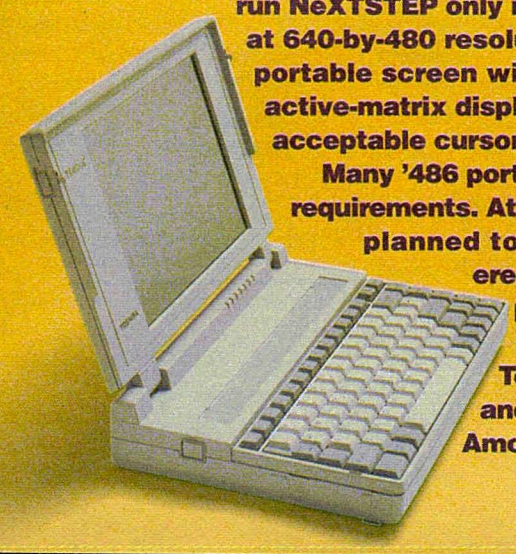
For the first time, we now have a real choice of systems across a spectrum of price, features, and performance. Henry Ford's palette of colors eventually gave way to the whims of the market. Now Steve Jobs's has too. Who knows? Some vendor may even offer NeXTSTEP running on an Intel box with a black-magnesium finish.

DAN LAVIN *is a* NeXTWORLD *senior editor. Thanks to NeXT's Bob Lawton for his help on this article.*

## '486 Portables Will T

**An important side benefit of NeXT's move to '486 hardware is the immediate availability of portable systems, something that has been sorely lacking from NeXT's product line. To old-timers who used to haul around NeXTcubes, the Slab may have seemed like a portable, but in reality NeXT has been completely shut out of the market for laptop and notebook computers.**

**No longer. The requirements for a NeXTSTEP portable are the same as for any other Intel-based machine, though most portables use the low-powered SL version of the '486 processor. Processor-speed and memory-configuration requirements are comparable to desktop machines. With today's hardware, however, the best available color or grayscale screen is good enough to run NeXTSTEP only in 2-bit grayscale at 640-by-480 resolution. Any type of portable screen will work, though an active-matrix display is suggested for acceptable cursor-response times. Many '486 portables will meet the requirements. At press time, NeXT planned to support AC-powered portables in Compaq's 486M and C lines, several of Toshiba's 6400 line and a NEC Prospeed. Among battery-pow-**



PHOTOGRAPH BY DAVID MAG

## NeXTSTEP

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*by* DAN LAVIN

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dows support.

Of course, NeXTSTEP isn't the only '486 operating system that is aiming for the Windows replacement market. IBM has always claimed that OS/2 can run Windows programs "better than Windows." SCO and Univel use Locus Merge, which simulates an entire PC in an X window. And SunSoft recently acquired a DOS/Windows emulator from Praxsys that is supposed to work similarly to SoftPC Professional.

But while the ability to run Windows programs is a requirement for any competitor to NT, it is not enough to convince customers to switch, says Terry Bennett, director of technical systems research at InfoCorp. If users want to run DOS and Windows programs, they'll stick with Windows and "and bite their nails waiting for NT."

"The software heritage for the general workgroup is all coming from DOS and Windows," says Bennett. "In order to look at UNIX, customers need to be looking at software that isn't available under DOS."

## THE RIGHT STUFF?

Windows NT is designed to correct many of the problems that today's Windows users are having – without forcing users to abandon Microsoft operating systems and move on to something else. Whereas Windows 3.1 runs on top of DOS, Windows NT puts Microsoft's graphical interface on top of a fundamentally new and robust operating system.

NT provides a reliable computing environment with memory protection, so that one application can't readily crash other applications running on the same computer. Like NeXTSTEP, NT is a multiuser system that provides for peer-to-peer networking and easy sharing of printers. NT even offers the promise of cheap laser printers with scalable fonts, thanks to Microsoft's TrueType technology, which has been adopted by many printer manufacturers. Microsoft also hopes NT will address the computer security needs of most of its users. The company boasts C2-level security, although that certification hasn't yet been awarded by the U.S. government.

Even without it, though, NT has features that NeXTSTEP lacks. For example, the system administrator can force or forbid users to change their passwords. One of the most impressive aspects of NT is the new NT file system (NTFS), which supports out of the box high-performance, fault-tolerant techniques such as disk mirroring, disk striping, and RAID. The NTFS can be restarted seconds after a system crash or power failure. The UNIX file system, on the other hand, must run through a file-checking protocol after a crash – a process that can take an hour or more on large systems.

But NT is still relatively untested in the field – and new operating systems have a history of being difficult beasts to manage. Even though the early releases of NT appear stable, the industry is still waiting to see the finished product: Bugs have a way of creeping in at the end of the development cycle, and Microsoft does not have a good record of shipping system software on time.

Some analysts also think that NT might be too complex for ordinary users to master, while not offering enough features to make it the server hub of a busy LAN. After the initial offering, Microsoft might take the feedback and return to the lab to figure out what users really need.

"NT has to try to be all things to all people. Our sense is that it won't be before the mid-1990s that the NT OS begins to ship in volume," says George Weiss, an analyst with the Gartner Group, a Connecticut-based research firm.

## OTHER CONTENDERS

Time may provide an opportunity for NeXT and others to establish their offerings in the market.

SunSoft – Sun Microsystems' wholly-owned software subsidiary – is busy, like NeXT, porting its operating system from proprietary hardware to Intel '486–based PCs. Whereas NeXT stresses the advantage of its object-based environment, SunSoft stresses its adherence to industry standards. For example, all NeXT applications are built with the company's proprietary Application Kit; SunSoft ships Solaris with three different industry-standard tool kits for developing applications. "When you give the developer a single tool kit, you limit the developer," says a SunSoft representative.

SCO is selling a similar vision of standards-based computing. SCO boasts nearly ten years of experience delivering UNIX and UNIX-like operating systems for Intel processors, and it recently shipped its millionth system. The company's catalog lists more than 7000 applications. SCO's Xenix and UNIX operating systems support more than 800 different off-the-shelf peripherals. SCO is becoming even more competitive with its new Open Desktop environment, which combines X, Motif, NFS, TCP/IP, and Merge, a program which runs DOS programs in X windows.

Univel, with its parent company Novell's purchase of USL, is also making a play to become a serious '486 contender. The company's UnixWare operating system is a full release of USL's System V Release 4.2, integrated so that it can share files from Novell NetWare servers. Like the other vendors, Univel is targeting mission-critical custom applications at companies that are downsizing and turning to client-server computing, says a company spokesperson.

IBM is making a two-pronged attack with OS/2. Organizations with IBM mainframes have used OS/2 as a simple tool for building network clients, thanks to OS/2's built-in SNA (Systems Network Architecture) connectivity. Outside of traditional mainframe shops, OS/2 has made a mark as a server operating system itself, particularly with government clients.

Unlike NeXTSTEP, all other '486 operating systems will also run on '386-based computers (although Solaris requires that machines be equipped with a math coprocessor or disk-accelerator board). That's important for capturing the installed hardware base, as well as for allowing customers to field the lowest possible cost per seat. And all systems other than NeXTSTEP will display color graphics on standard VGA adaptors – they don't need expensive memory-mapped hardware, since X needs less bandwidth compared with Display PostScript.

## NeXTSTEP on the Road

**ered units, NeXT expected to provide support for the Altima 433D, Compaq LTE Lite, several of the Toshiba 4400 machines, and a future NEC product line. Several of these are so small and light that they qualify as notebooks rather than laptops.**

**We were able to play with an early version of NeXTSTEP for Intel running on a Toshiba 4400C notebook loaded to the gills with 20MB of memory (thanks to an add-in kit by Apricorn) and an active-matrix display. It weighed just eight pounds, including the battery, and was also equipped with a docking station to hold the Ethernet card when we returned to our desk.**

**NeXTSTEP ran fast and was stable, though we had to get used to a few facts of life about portables. First, the 640-by-480 resolution provides just one-quarter the pixels of a MegaPixel Display. Even with hiding the Dock and menus and making other screen elements as small as possible, it seems likely that some apps will simply not run effectively at this resolution. Hopefully, developers will redesign their apps in low-resolution versions for portable users.**

**The second difference is that, unlike fully networked desktop NeXTs, portables do not live on a network. Users will need to adjust to dialing in at regular intervals and managing their files and e-mail accordingly.**

*by* DAN LAVIN

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PHOTOGRAPH BY DAVID MAGNUSSON

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*Thanks to NeXT's Bob*

## MAY THE BEST OS WIN

Industry observers point out that the contest for the '486 market need not be decided upon technical merits. "UNIX was already in the hands of people [in 1981]," says Carl R. Dichter of *UNIX Review*. "We watched a single-user, single-tasking operating system take over the market."

For the '486 desktop, says Dichter, "there is only room in the market for a few big players." He sees Microsoft's competitors "converging and joining forces against Windows NT." As for NeXT, Dichter says, technical advantages may not be enough. "We've seen better operating systems get killed off by DOS."

That's why NeXT is careful to position its product as an OS designed to quickly develop object-oriented, client-server applications. While that strategy has been successful to a point, though, "It's spot successes," says the Gartner Group's George Weiss. "They have found companies that will love NeXT, that environment, and working with those tools."

These customers, says Weiss, don't care about being locked into proprietary tools: "They want an application up and running as fast as possible to gain a competitive advantage – even if they have to junk the system later on."

Thus, NeXT may be limiting its future opportunity if it positions NeXTSTEP only as an object-oriented development environment, warns Dataquest's Cubbage. "They are saying that they have a high-value niche market. They will live in that niche market as long as it takes their kind of power and their kind of software. However, the commonest kind of thing I've seen in here [in the past six months] are products that look like InterfaceBuilder, and they're all designed for Windows."

SIMSON L. GARFINKEL *is a* NeXTWORLD *senior editor.*

# Porting NeXTSTEP Programs

**When NeXT announced NeXTSTEP for Intel last year, the company claimed that most existing applications would port to the new operating system with little more than a recompile. NeXT even showed off newly ported versions of Create and Concurrence running on NeXTSTEP '486 to boost its claim.**

**Despite Steve Jobs's statement that everything about NeXTSTEP and NeXTSTEP for Intel was the same, observers remained skeptical. PCs are indeed different than NeXTstations: different video displays, different keyboards, different mice. Wouldn't programs have to be modified? Furthermore, the Intel and Motorola microprocessors represent numbers with exactly the opposite byte order: Wouldn't data files written by one have to be translated to be readable by the other?**

**A year later, it seems that most of these fears were unfounded. That's because, unlike in the DOS world, NeXT programs don't directly access the computer's hardware; they communicate with the NeXTSTEP operating system instead. By porting the operating system itself, NeXT has hidden all the differences. (The idea of porting applications by porting the operating system dates back to 1977, when Bell Labs ported the UNIX operating system from a DEC PDP-11 to an Interdata 8/32.)**

**In my experience, programming NeXTSTEP for Intel is almost exactly the same as programming a NeXTstation. For example, every program in my book, NeXTSTEP Programming, can be run on NeXTSTEP for Intel by simply compiling the program on a '486 computer. I also tried porting SBook, my 26,000-line address-book program. The program worked on NeXTSTEP '486 the first time, without a single line of code being modified.**

**Other programs may not fare as well. For example, windows that are wider than 800 pixels or higher than 600 simply won't fit on the smaller screen of most '486 systems. And some programs, like WriteNow, won't port at all, since they're mostly written in 68000-assembler language.**

**Data-file compatibility is likely to be a nagging problem for some developers. NeXTSTEP's archiving package will automatically swap bytes, but developers who write their own – or who use bit fields – will have to modify their programs to deal with this nagging architectural incompatibility. SBook does neither, but another program I wrote did its own archiving, and I still haven't tracked down all of the byte-swapping bugs.**

**Other NeXT programmers are reporting similar experiences. It took David Pollak, president of Athena Design, just 30 minutes to get his Mesa spreadsheet working under NeXTSTEP for Intel, though it took the better part of a week to get all of the bugs ironed out to provide true file compatibility.**

**Not surprisingly, SunSoft reports similar experience with developers porting from Solaris on SPARC to Solaris on Intel. Most Solaris developers only have to recompile their application. "It's taken as little as 30 minutes; the longest that I know of was three days," says Judy Borcz, a product manager at Sun.**

**Windows NT developers tell similar stories about moving from Intel to high-performance RISC architectures. "Third parties that have already ported to NT are experiencing very little difficulty in moving to the Alpha platform. In most cases it's just a recompile," says David Price, a manager at Digital Equipment Corporation's Windows NT project.**

**Operating in a mixed environment – Intel and Motorola, or Intel and SPARC – is a different matter entirely. NeXT is the only company that has announced any sort of system for letting two different architectures run from a single binary. NeXT's "fat binaries" should make life easier for both developers shipping programs on floppy disks and system administrators trying to manage heterogenous networks.**

**NeXT has also modified the UNIX file system so that floppy disks and hard drives formatted on one kind of computer can be readily moved to another – something that NT does but Solaris doesn't. "At Sun, we used to move data around on DOS floppy disks," says Bob Lawton, NeXTSTEP for Intel program manager, who formerly headed Sun's Solaris on Intel project. "That's stupid."**

*by* SIMSON L. GARFINKEL

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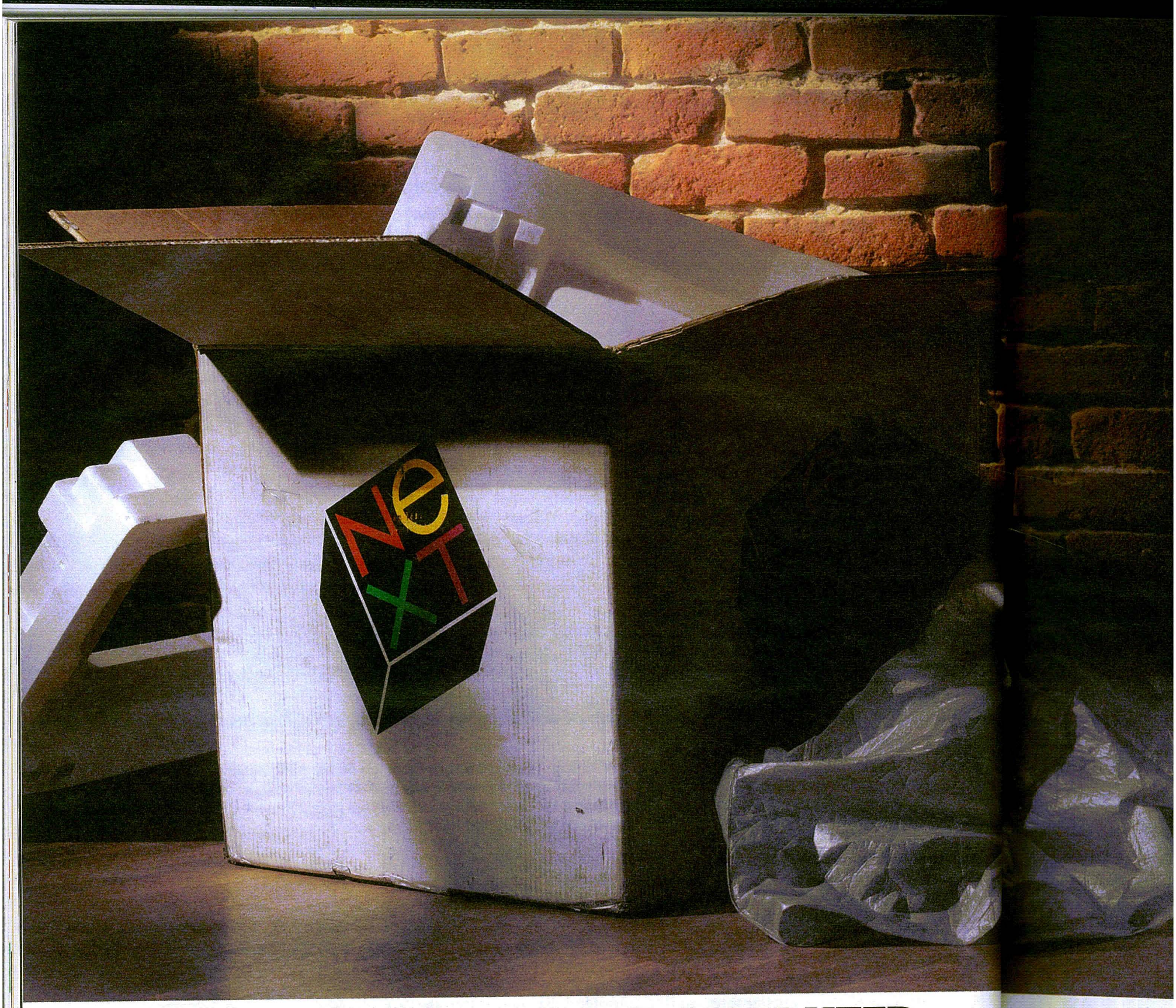


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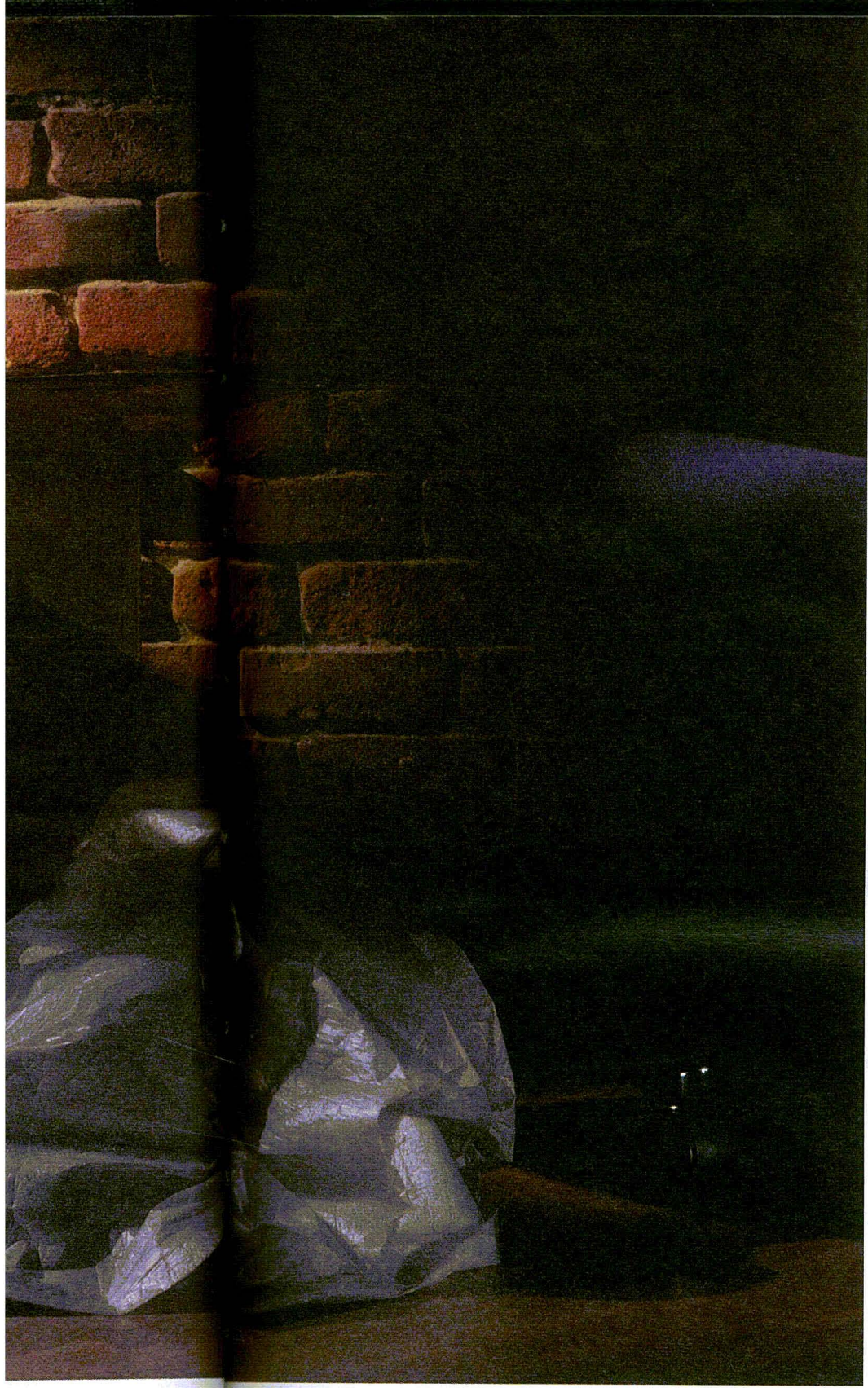

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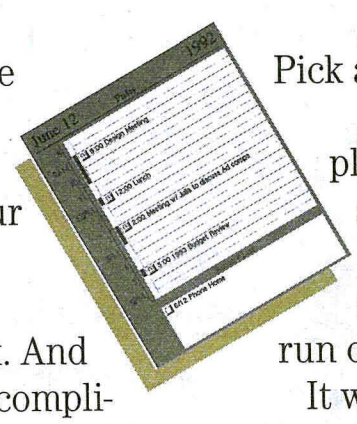

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# Value Versus Price

SIMSON L. GARFINKEL

Last month, reading through the Help Wanted section of the *Boston Globe*, I discovered an advertisement for a telecommunications company seeking NeXTSTEP programmers. The full-page spread cost the company a cool $38,000.

There's never been a better time than now to be a NeXTSTEP programmer. Companies aren't looking for entry-level programmers – they're seeking team leaders and offering salaries in the high $60s to low $90s.

There's even more money to be made as a consultant. That's because many companies want to test the waters by having a few hired guns write one of those mission-critical custom applications before committing themselves to training or new hires. After all, most people know that it's one thing to watch a hot Steve Jobs demo; it's another thing entirely to sit down and make something that actually works. No matter how easy InterfaceBuilder seems, building applications still involves more work than simply connecting objects with thin black lines.

That's why NeXT's announced pricing for NeXTSTEP '486 – $995 for the user version and $2495 for the developer edition – is so disturbing. NeXT needs to create an army of evangelist-consultants who are enamored with the technology and hungry to share their vision. Now is the time to seed the market. But, oddly, NeXT has priced NeXTSTEP '486 to turn a quick buck from outfits like Chrysler Financial. NeXT doesn't see single-copy sales having any impact on the company's future.

Self-employed consultants aren't going to spend $2495 for a copy of NeXTSTEP to run on their spiffy new '486s. Not when they can buy a comparable OS/2 or Windows 3.1 development system for under $500 – and the beta version of Windows NT for less than $100.

"It sounds as if they're coming out with a killer product, and they're taking every step necessary to make sure that they fail," says a friend and Windows consultant who would dearly love to add NeXTSTEP to his portfolio. His problem: The cost of admission is just too high.

NeXT is quick to point out that NeXTSTEP isn't comparable to the competition. It compares its object-oriented environment to expensive CASE systems costing $10,000 or more. The payoff in increased programmer productivity is worth it, NeXT says.

While that argument might make sense to the company footing the bill for a project, it rings hollow to my friend, who gets paid by the hour. Sure, he might be five times less productive writing programs for Windows, but his hourly rate is still the same. Is anybody going to pay him five times more to write NeXTSTEP programs simply because he's five times more productive? Not a chance.

So why be a NeXTSTEP consultant? Because its more fun to write programs for NeXTSTEP than for Windows.

It puts my friend in a difficult position. He likes NeXT but can't afford to shell out $2495 to get a copy of the NeXTSTEP developer edition. Is he better off pirating a copy from a willing co-conspirator or just forgetting about NeXTSTEP and sticking with Windows NT?

The feverish competition for the hearts and minds of programmers is about to take off, as NeXT, SunSoft, and Microsoft all expect to ship advanced operating systems for Intel this summer. NeXT's technology is more than competitive, but that may not be enough. To attract developers, NeXT will have to reconsider its pricing strategy.

SIMSON L. GARFINKEL, NeXTWORLD *senior technical editor, is coauthor of* NeXTSTEP Programming *(Springer-Verlag, 1992).*


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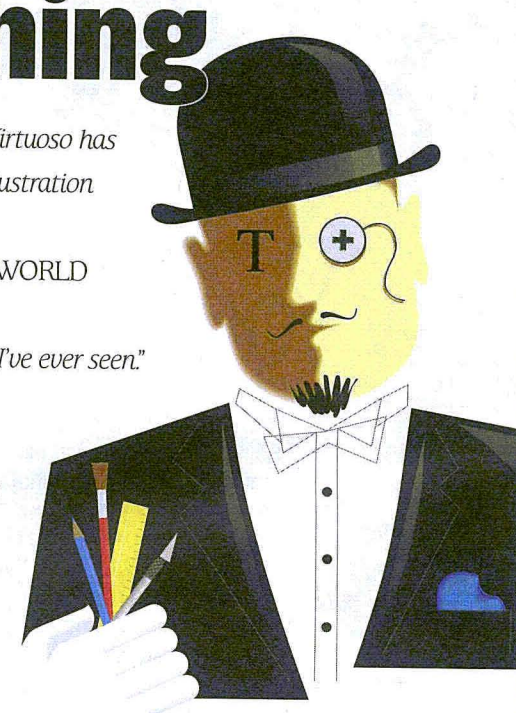

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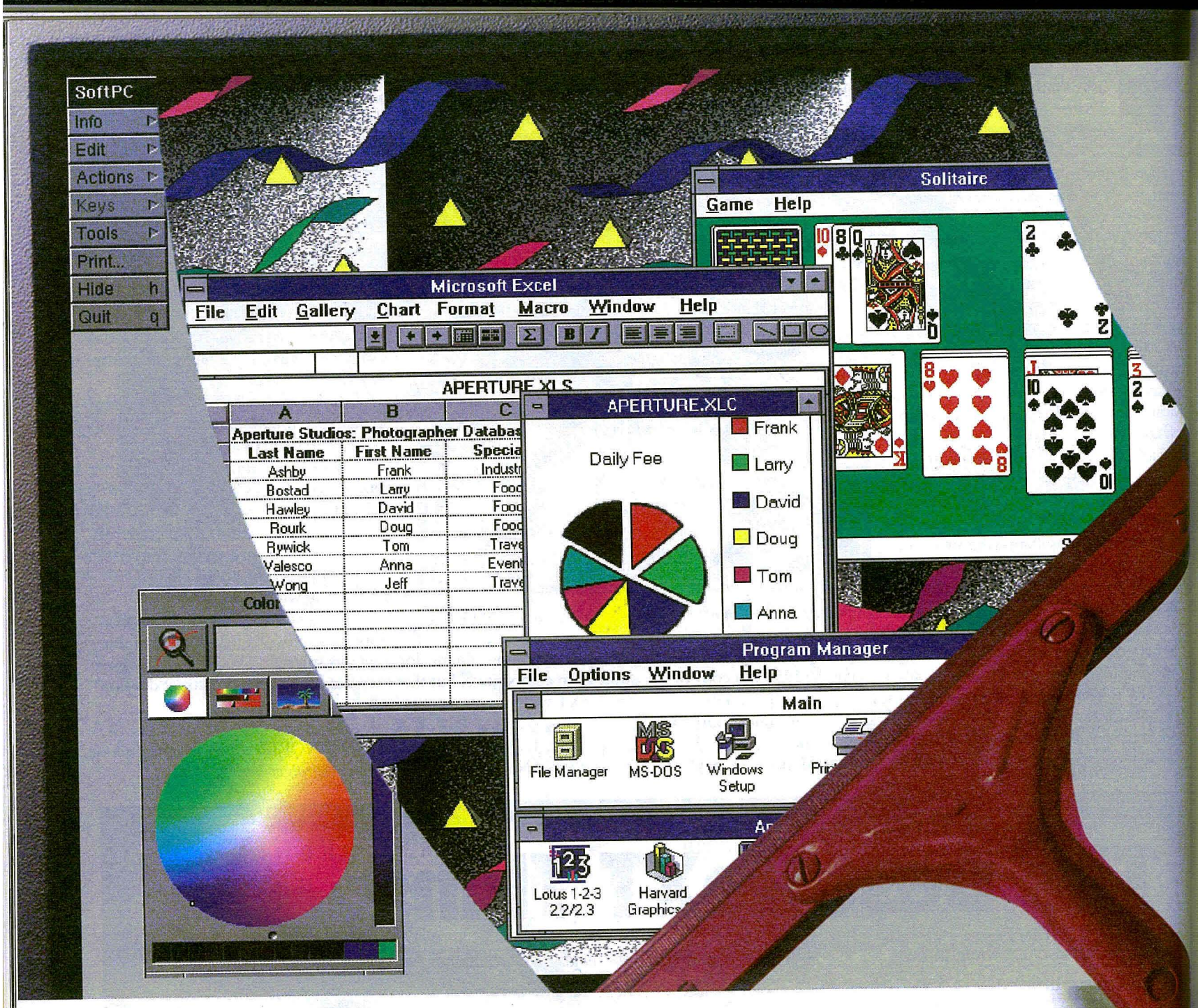


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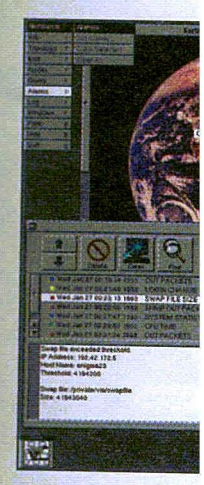

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# Business Case

DAN LAVIN

As painful as it is for long-time NeXT partisans like myself, the demise of NeXT's hardware was a necessary step for achieving both the idealistic and business goals of the company.

The idealistic goal behind NeXT's seven-year odyssey has been to fundamentally change the way people work. Unfortunately, 20,000 units a year hardly makes a ripple in the world. Even with projected increases in hardware sales, NeXT users would have remained in a technological ghetto. To have a chance of really changing the world, NeXT needs hundreds of thousands of mainstream business users. Let's look at the business case behind NeXT's software-only strategy.

The average revenue to NeXT from a sale of NeXTSTEP might be about $600, versus an average of about $6000 per sale on a complete NeXT machine. On the face of it, this looks like NeXT would make only ten percent as much money. Increased sales and higher profit margins on software, however, more than make up for that.

First, a sale for one-tenth the ticket price is much easier to make. A 100-unit sale becomes a five-figure decision for middle management, while a 100-unit hardware commitment is a million-dollar purchase needing approval from corporate capital-planning commissars. Yes, the customer needs an Intel machine, but corporations are already buying '486s by the boatload.

Second, NeXT doesn't need to generate equal revenues to make equal profits: Using rough industry benchmarks of an 80-percent gross margin on software (versus 40 percent for hardware), NeXT needs to increase its unit sales by a factor of five to match its 1992 profit figures.

This assumes that NeXT's cost structure will remain the same, but it will not. Through layoffs and other cost savings, NeXT plans to reduce its overhead by 30 percent to 40 percent, so it would only need to double the number of unit sales to achieve the same break-even point.

And NeXT can do considerably better than break even; doubling sales is conservative. An average field sales rep in the systems-software industry sells several million dollars worth of product a year. That's several thousand seats of NeXTSTEP per salesperson, as opposed to about 200 seats in 1992. For now, NeXT has had to reduce the number of reps dramatically, but any new reps will boost the installed base in meaningful leaps.

This is just the direct-sales force, which will call only on companies in the *Fortune 200* range. Without the anchor of black hardware, the software-distribution channel of dealers, VARs, and systems integrators will come into meaningful play for the first time.

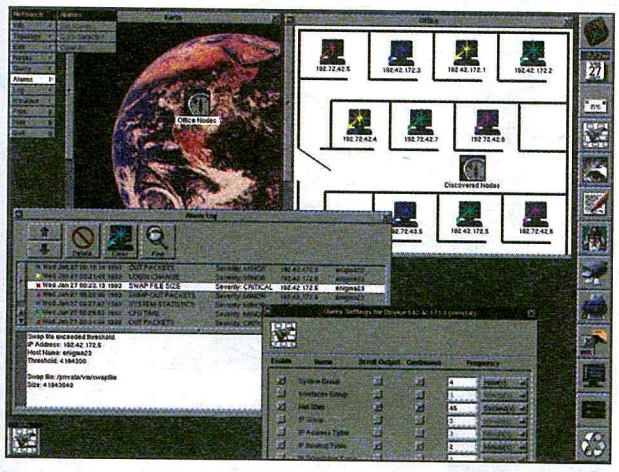
Beyond direct and channel sales, other computer manufacturers now have an incentive to provide NeXTSTEP as an option, which could result in major additional sales that were impossible as long as NeXT sold hardware.

Taken together, reaching a base of several hundred thousand units before Taligent or Cairo sell their first copies is an achievable goal. A solid $30-million software company will deliver more than double the number of changed users than a shaky $120-million hardware company.

The fact is that NeXT had little choice but to make these changes or risk losing it all. With the high overhead and thin margins of hardware, a bad quarter could have had dire consequences. With the new strategy, NeXT reduces that risk and boosts the potential up side.

As difficult as the change is for all of us, especially those directly affected, more seats serve NeXT's business goals by providing higher profits for stockholders. The changes also serve NeXT's idealism by bringing the advantages of NeXTSTEP to a much wider audience. And that's why we're all here, isn't it?

DAN LAVIN *comments on business issues in NeXT Ink.*

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# Virtu Perfo

*Move over drawing pr*

by TONY BO

Altsys has c Systems fo in illustrat since the c ing progra sys-developed Aldus Fr petes against Adobe Ill the Mac and Windows Illustrator was the first NeXT, offering curve c image tracing, text ma minimal page-layout fe ject-transformation toc scaling, skewing, and s color separations for pr Altsys Virtuoso has arr virtually everything Illus plus more typographica manipulation features is also the first drawing the NeXT platform to p capability to color-separ images and PostScript

Considering that Ill made no major revisions product in the last two ye

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## Illustrator (rating upda

*Although Illustrator was near when it came out, Adobe has program unchanged for two y the march of technology and A challenge, the program now ra duced four cubes.*

ILLUSTRATION BY GORDON STUDER

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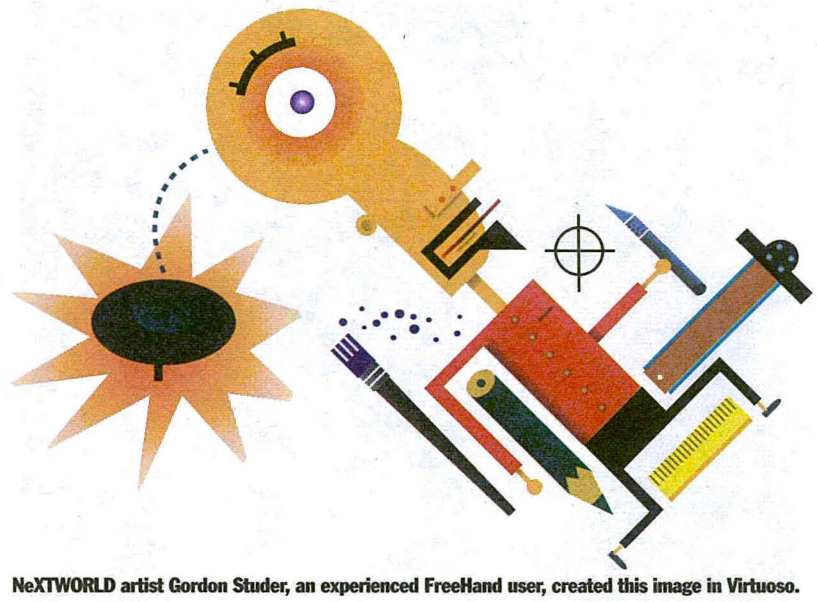
# Virtuoso Performance

*Move over Illustrator – here comes a drawing program with text in columns*

*by* TONY BOVE *and* CHERYL RHODES



NeXTWORLD artist Gordon Studer, an experienced FreeHand user, created this image in Virtuoso.

Altsys has dogged Adobe Systems for supremacy in illustration software since the dawn of drawing programs. The Altsys-developed Aldus FreeHand competes against Adobe Illustrator on the Mac and Windows platforms. Illustrator was the first to arrive for NeXT, offering curve drawing and image tracing, text manipulation, minimal page-layout features, object-transformation tools (rotating, scaling, skewing, and so on), and color separations for printing. Now Altsys Virtuoso has arrived with virtually everything Illustrator offers, plus more typographical and object-manipulation features. Virtuoso is also the first drawing program on the NeXT platform to provide the capability to color-separate TIFF images and PostScript graphics.

Considering that Illustrator has made no major revisions to its NeXT product in the last two years, Altsys seems to have leap-frogged Adobe this time, especially for layout-intensive applications.

### Virtuoso 1.0

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### Illustrator (rating update)

*Although Illustrator was nearly perfect when it came out, Adobe has left this program unchanged for two years. With the march of technology and Altsys's challenge, the program now rates a reduced four cubes.*

#### Drawing and tracing

Virtuoso offers most of the drawing features found in Illustrator and adds some new ones. The bezigon tool lets you draw any kind of free-form path with any number of points and automatic curvature – the program decides where to place control points while you are placing the corner points. The tool is especially useful for drawing shapes that consist of lines and circular arcs. Virtuoso also offers a multigon tool to create polygons and star bursts, giving control over the number of sides and obtuseness of the shapes.

One unique feature of Virtuoso is the capability to use its freehand tool as a variable-weight pen for pressure-sensitive drawing or painting, or as a calligraphic pen for calligraphy. A drawback of this is that the program does not offer the ability to set tolerance levels for controlling sensitivity to hand movements (as Illustrator does). Nevertheless, Virtuoso is more forgiving of errors, offering up to 100 levels of undo, compared with Illustrator's single level.

In addition, Virtuoso adheres more to the NeXT's interface, providing an Inspector panel that includes information about any selected object. Precise changes to the object are made by changing the attributes listed in the panel. This feature comes in handy when you do blends. With the Inspector panel, Virtuoso lets you automatically reblend a blend without having to delete and regenerate the steps (as Illustrator requires).

Virtuoso lets you trace images automatically and drag a selection rectangle around a placed TIFF image to trace only part of the image, so you get only the curve you want. Compared with Illustrator, however, Virtuoso makes you go through an extra step when manually tracing images: You must place the image in the document, then send it to the background layer to make it lighter in shade for easier tracing. Virtuoso also lacks an auto-trace gap-distance setting (for ignoring gaps in an image) and a color-tolerance setting (for controlling the tool's sensitivity to color differentials in an image).

Virtuoso provides convenient Fill and Line Inspector panels for setting an object's fill pattern or color and line attributes. Virtuoso also has arrowheads for lines, a Styles List for quickly applying fill and line styles to objects, and 40 editable PostScript lines and fills (you can also add your own). But the program does not go as far as Illustrator in its pattern control, which allows you to define any graphic as the basis for a pattern.

#### Using text

Virtuoso offers more text-manipulation features for single-page layout of text blocks than any other drawing program on the NeXT. It offers automatic hyphenation, copy-fitting control, and settings for multiple rows and columns inside a text container. It also provides extensive control over text attributes such as leading, kerning, tracking, and spacing.

When you select text in Virtuoso, a ruler appears at the top of its container, making five types of tabs available: align left, align right, center, decimal, and wrapping (for tabular columns). The exact dimensions of a container and text insets can be specified in the Inspector panel. Unlike Illustrator and other drawing programs, which treat each text block as a single column, Virtuoso lets you specify several columns and rows within a container, and you can wrap text from top to bottom of a column or from side to side across columns.

Virtuoso also offers features found only in page-layout programs, such as automatic rules-based hyphenation and a keep-on-same-line option. Virtuoso goes further than Illustrator in typographic control by offering ragged-zone control, spacing before and after paragraphs, a keep-lines-together option, and paragraph rules (lines that float with the text). It also goes further in controlling text set along a path, with settings available in the Inspector panel. Virtuoso lets you set text-standoff distances for wrapping text around a graphic object or TIFF image. The only feature missing is an auto-kerning option (for using the font designer's built-in character-pair kerning) that can be applied to an entire document. Virtuoso's kerning and tracking sliders are more convenient than Illustrator's, and Virtuoso offers three different methods of controlling line leading. Virtuoso also provides in-line, shadow, and zoom text effects.

Overall, Virtuoso offers more text-manipulation features and con-

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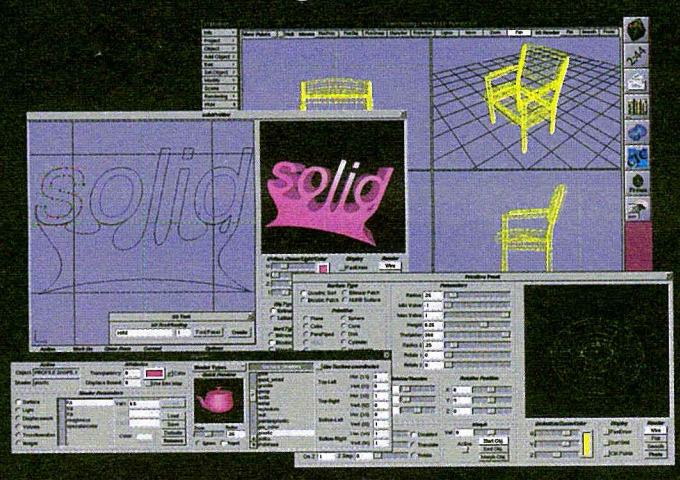

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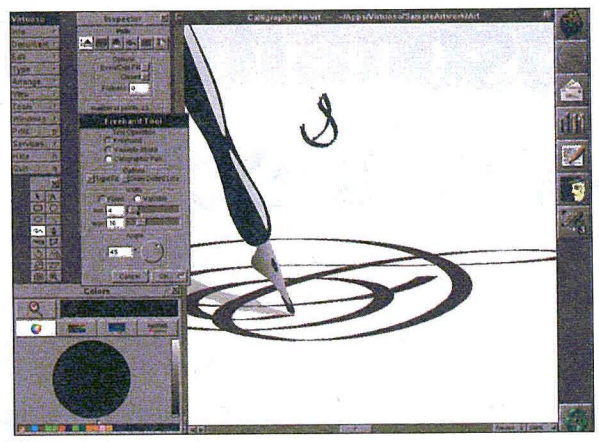

**You can change Virtuoso's freehand tool into a variable-weight pen for pressure-sensitive drawing or painting, or into a calligraphic pen for calligraphy.**

trol over attributes than other drawing programs, and is much better than Illustrator for creating tables with rows and columns.

### Layout and assembly

Virtuoso offers exceptional features for arranging graphic objects, such as rulers, ruler guides, grids, snap-to options, and precise movement control. The program's powerful Layers feature lets you organize the illustration's parts into named layers that can be separately printed, viewed, and locked. Layers make it easy to change the stacking order of overlapping elements in a drawing or to print documents without printing their TIFF images. You can also manipulate the stacking of elements in a single layer.

Other cool layout features in Virtuoso include alignment and distribution capabilities not found in Illustrator. Virtuoso can align selected objects based on the rectangular area each object occupies. It can also distribute, or space out, objects proportionally along an axis, even if the objects are different in shape and size. While Illustrator's methods of measuring distances and moving objects are powerful for precision work, Virtuoso's alignment options are more automatic and easier to use, which makes Virtuoso better than Illustrator for typical layout functions.

### Different strokes

Virtuoso and Illustrator are more alike than different, providing excellent tools and features for illustration, color separation, and printing. They differ in the special effects that are not typical of drawing programs: Virtuoso takes care of TIFF images automatically, whereas Illustrator automatically creates charts and graphs with drawn objects. In addition, Virtuoso lets you resize TIFF images to snap to different sizes according to the printer's resolution. Virtuoso can also apply color directly to TIFF images, replacing black areas.

Virtuoso offers no automatic charting and graphing tools (both of which are available in Illustrator), and the program, in its 1.0 version, is less mature than Illustrator due to its support of NeXTSTEP 3.0 features. The Altsys product crashed twice (both times when we were using questionable fonts in the Font panel to dynamically alter the appearance of text), but otherwise performed flawlessly.

As to the inevitable comparisons with Illustrator, Virtuoso excels in text formatting and page layout, while Illustrator is better at drawing freehand shapes and tracing images. The documentation for Illustrator is more concise, easier to follow, and easier to use for reference than Virtuoso's documentation, which is nevertheless complete and professional. By use of Inspector panels, Virtuoso conforms closer to the style of NeXT applications.

Your choice will most likely depend on the availability of special features, or the overall style and feel of the program. Fortunately, the programs import and export common file formats and can transfer PostScript graphics to and from each other, leaving professional illustrators the option of using both. But for those users who need to create single-page layouts with text in rows and columns, Altsys gives virtuoso performance.

TONY BOVE *and* CHERYL RHODES *are contributing editors to* NeXTWORLD *and publishers of the* Bove & Rhodes Inside Report on Multimedia and Publishing Technologies. *They can be reached at t-and-c@toad.com.*



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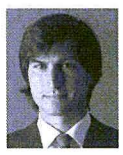

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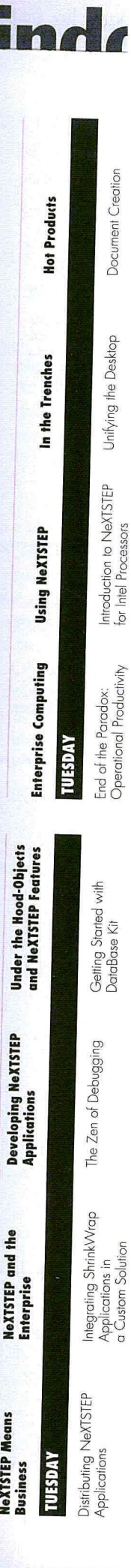




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| Issues in System Administration | Integrating Intel and Motorola Based Hardware (repeat) | Comprehensive Support Services | |

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| NeXTSTEP Means Business | | Developing NeXTSTEP Applications | Under the Hood-Objects and NeXTSTEP Features |
|---|---|---|---|
| **TUESDAY** | | | |
| Distributing NeXTSTEP Applications | Integrating ShrinkWrap Applications in a Custom Solution | The Zen of Debugging | Getting Started with DataBase Kit |
| A Developers' Guide to Enterprise-Wide Deployment | Developing Obj-C Applications for NeXTSTEP & Windows | Validating NeXTSTEP Applications and Objects | Real-World DataBase Kit Applications |
| NeXT's Markets and Their Development Opportunities | | The Zen of Debugging (repeat) | Advanced DataBase Kit Issues<br>Getting Started with DataBase Kit (repeat) |
| **WEDNESDAY** | | | |
| NeXTSTEP Means Business | | Getting More Speed Out of Your Application<br>Introduction to NeXTSTEP Programming | Using Release 3 Features |
| Protecting Your Technology | | UI Performance<br>Building Better NeXTSTEP Applications | Object Links in Detail |
| Nothing's Easier than NeXTSTEP Development | Workflow Tools in Custom Applications | Writing Dynamic Applications | Programming with Distributed Objects |
| Succeeding with Object-Oriented Development | Object-Oriented Client/Server Application Design | Creating Interface Builder Palettes | Indexing Kit |
| **THURSDAY** | | | |
| "Dr. StrangeApp, or How I Learned to Stop Worrying and Love the ISVs" | NeXTSTEP and OODB Integration | Building Reusable Objects<br>Writing Dynamic Applications (repeat) | |
| Strategies for Dynamic Personalized Systems | Advantages of Electronic Documentation | Creating Interface Builder Palettes (repeat) | DriverKit for NeXTSTEP |
| Developer Success Stories | A NeXTSTEP Shared Development Environment | Getting More Speed Out of Your Application (repeat) | Using Release 3 Features (repeat) |
| Meet the Software Engineers | Sketching Out a Better User Interface | UI Performance (repeat) | Object Links in Detail (repeat) |

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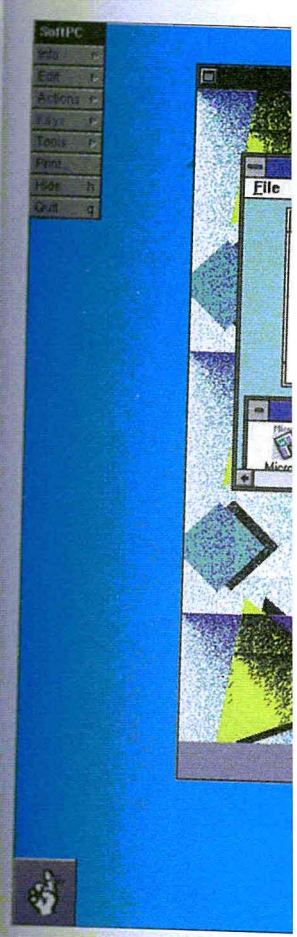
# Wind Dress

## SoftPC 3.0 with Micro

by CHRISTOPI

Using a PC a encing a N seem like s wrists to se red. But if y access a DOS- or Wind application or CD-RO ing a PC may be a neces with which you have to of putting a clunky PC c for the occasional dive i Insignia Solutions offers if somewhat slow, softv tion to the DOS dilemm importantly, SoftPC al and-paste interoperabili your NeXT and DOS ap

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# Windows Dressing

## *SoftPC 3.0 lets you dress for success with Microsoft Windows*

by CHRISTOPHER STETSON

Using a PC after experiencing a NeXT might seem like slitting your wrists to see the color red. But if you need to access a DOS- or Windows-based application or CD-ROM, then having a PC may be a necessary evil with which you have to live. Instead of putting a clunky PC on your desk for the occasional dive into DOS, Insignia Solutions offers an elegant, if somewhat slow, software solution to the DOS dilemma. More importantly, SoftPC allows cut-and-paste interoperability between your NeXT and DOS applications.

SoftPC 3.0 is effectively a robust, DOS 5.0, Microsoft Windows–capable PC running inside your NeXT machine. SoftPC offers up to 16MB of extended memory. If you have a color NeXTstation, SoftPC looks like a 16-bit-color PC. The Windows screen is also resizable, so Windows can have as much screen area as you want to dedicate to it. DOS applications that don't have PostScript print drivers can still print, because SoftPC does on-the-fly HP LaserJet-to-PostScript conversions. Since SoftPC emulates the '286 instruction set at '386 speeds, the few programs that are '386- or '486-specific will not run.

SoftPC 3.0 makes it even easier to put your DOS files in a UNIX partition, although this capability was present in an earlier version as well. As before, SoftPC will create DOS partitions on the NeXT file system, but the partitions look like whole files. Using the NeXT file system instead, all DOS files appear as UNIX files and can be accessed by NeXT and UNIX programs alike, as well as SoftPC. The preferences settings allow you to set up either DOS or UNIX disks.

Besides sharing files, you can also cut and paste between your NeXT and SoftPC. Text is supported bidirectionally, so you can move text either way. You can also take graphics from Windows onto the NeXT, but you can't bring NeXT graphics over because Windows doesn't support PostScript for single-page layout of text blocks.

### Start your engines

So how does it feel? It is amazing in some ways to see a real, functioning PC screen right in the middle of your NeXT. Besides making you just feel good that you are not constrained to that brain-dead universe, SoftPC tackles the very difficult job with aplomb, and, in our tests, without a hitch.

In terms of speed, as promised by Insignia, it felt like a slow '386. I found that SoftPC ran Windows like my 16MHz '386 SX PC with 8-bit color turned on. I generally don't run my PC with 8-bit color when I do use it, but it is acceptable for short spurts. You need a NeXTstation Turbo or faster if you plan on using Windows under SoftPC for any time at all. Interestingly, I found that as I performed a repetitive operation, such as drawing a rule, SoftPC sped up.

The feeling of slow performance is slightly illusory, because the NeXT is so fast at the same things at which Windows appears to be so slow. Moving a window around within Windows, an operation that is instantaneous on the NeXT, is pretty slow because it can't be mapped directly to a NeXT window operation. When the mouse is over the SoftPC's Windows window, it appears as a typically lethargic Windows mouse, but as the mouse moves past Windows to other NeXT apps, it pops out and immediately accelerates.

Running DOS apps was a much better experience, because the multiple levels of emulation could be stripped away. Microsoft QuickBasic ran acceptably, both for typing and running Basic programs. SoftPC has a mouse driver that seemed to work well, if a little slowly. Insignia said that NeXT users with the new ADB mouse will see faster mouse performance.

Another drag on performance is the SoftPC's VGA emulation. To effectively emulate VGA, and even Super VGA, SoftPC looks to hardware like a Video 7 card, a common video board on the PC. Emulating VGA is not an easy task;

### SoftPC 3.0

*Soft PC is a nearly flawless emulation of a low-end '386 PC on your NeXT. The performance is a little slow in Windows mode but more than adequate for DOS.*

**$499 DOS version; $699 Windows version**

*Insignia Solutions, 526 Clyde Ave., Mountain View, CA 940043. 415/694-7600.*

**SoftPC provides a Super VGA display to run Windows and DOS apps. Windows applications ran as fast as they would on a 16MHz '386.**

Microsoft has not even fully implemented VGA emulation in Windows for DOS apps, and having to remap VGA to Display PostScript adds further to the strain.

### Some differences

Some of the differences between the NeXT and PC became clear when I was trying to add a program to the DOS **PATH** command. The NeXT keyboard did not seem to support the DOS \ (back slash), a required symbol for a **PATH** statement. After a little searching, I found the back slash on a SoftPC palette called Number Pad, where it has been moved, along with the rest of the NeXT number pad, because SoftPC has remapped the NeXT keyboard to behave like a PC keyboard. SoftPC has a Keys menu with such things as function keys, Print Screen key, Scroll Lock key, and a series of others, although it lacks a back slash key.

Another difference centers around the floppy. SoftPC supports DOS floppies, but using them is cumbersome because of the interaction between SoftPC and the NeXT floppy driver. In order for SoftPC to acknowledge a floppy, the floppy must first appear in the File Viewer when SoftPC is launching. Ejecting a floppy requires first using the Detach Floppy command in SoftPC, then using the Eject command in the workspace. Once the routine is committed to memory, it is pretty straightforward, if inelegant.

You set up SoftPC's memory in the Preferences menu, which also lets you set up printers, com ports, and other system features. Compared to having to set up system features on a PC, SoftPC's iconic interface is much more straightforward and doesn't require you to know about cylinders, interrupts, or any of the arcane features of PC configuration.

### Bottom line

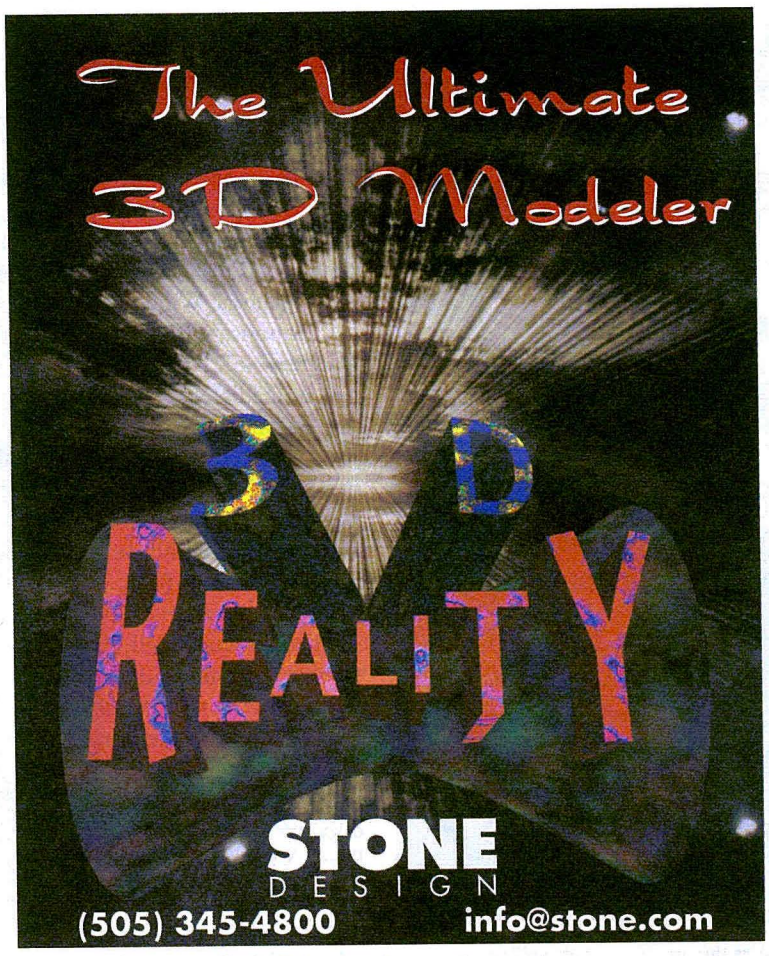
SoftPC is not a program that you can casually try out on your system. It takes a minimum of 25MB of hard-disk space. It also takes a toll on your system's processor. When SoftPC is left running in the background, other applications behaved sluggishly. Fortunately, Insignia has included a Freeze command that stops all SoftPC activity, reducing SoftPC's CPU usage to just about zero.

Insignia was not able to support all Windows functions in this release. Multimedia extensions, which play sounds and control other multimedia devices, is not supported, although SoftPC, through the NeXT's built-in SCSI port, does support DOS CD-ROMs in ISO 9660 format. A version of Soft Node, Insignia Solutions' NetWare-aware SoftPC, was scheduled to be available in the first quarter.

Ironically, a PC emulator will be required to run programs on PCs running NeXTSTEP '486. Because NeXT will be using SoftPC's technology for NeXTSTEP '486, though, the feature set is exactly what you would want it to be. Insignia says it expects to get 90 percent of the performance of a '486 when running SoftPC on the Intel platform. This means that a 50MHz '486 will behave like a 45-MHz '486 for Windows. And because NeXTSTEP '486 has support for 16- and 24-bit color, NeXTSTEP '486 will be the only 32-bit operating system able to run Windows in a true-color mode, right out of the box.

The bottom line on SoftPC is that if you require access to DOS or Windows apps and need only '386 power and the '286 instruction set, SoftPC is the way to go. At $499 for DOS-only and $699 with Windows, it is cheaper and more elegant than a PC and doesn't take up the desk space that a PC will. It also allows you to exchange data and share files between your DOS, Windows, and NeXTSTEP apps. Just a few years ago, 16MHz performance was truly speedy, but the world has changed. So if you need '486 power SoftPC is not the way to go.

CHRISTOPHER STETSON is *a multimedia developer based in Brooklyn, New York. He has five years experience in the computer industry on NeXT, PC, and Macintosh platforms.*



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OPHER STETSON *is dia developer based in New York. He has five rience in the computer n NeXT, PC, and Macin- rms.*


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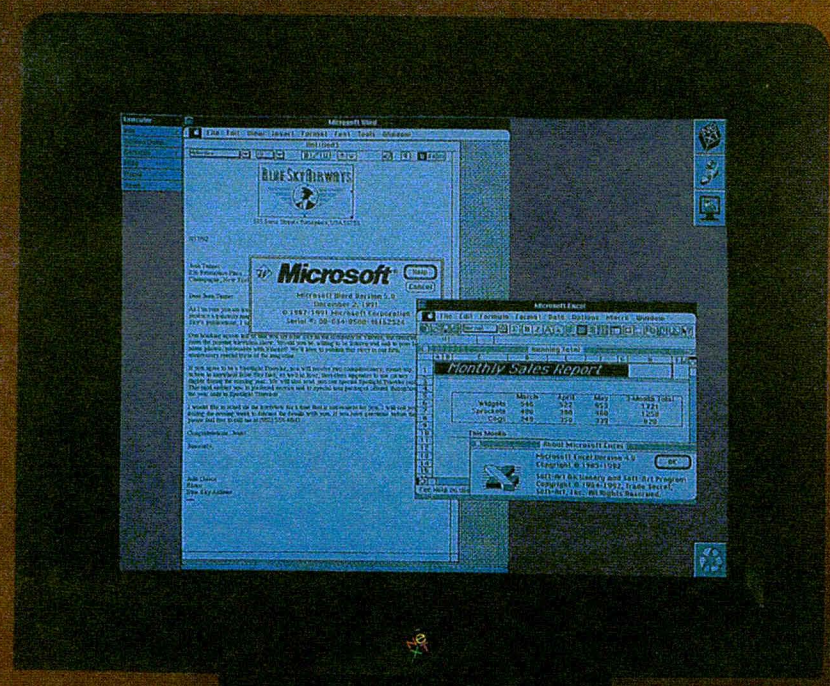


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# Ultimate Scrapbook

## *Millennium's NoteBook puts personal and group information at your fingertips*

*by* DAN RUBY

When you look at the individual ideas embodied in Millennium Software Labs' NoteBook 1.1, you don't find anything truly new. Outlining. Free-form databases. Notebook metaphor. The notion of idea, or information, processing. Each concept has found expression in software products on other computer platforms.

But the synthesis of all these ideas in one polished program delivers something truly unique: the ultimate digital scrapbook for storing and organizing massive amounts of personal or group information. The result is a program that changes how you work.

NoteBook, the brainchild of Jayson Adams, who also developed Engage! with highly original Dock-extension capabilities, is among the most useful and elegant applications available under NeXTSTEP. It should win a large following of current NeXT owners and could even sell other users on the platform. It's that good.

Like all new ideas in software, it is difficult at first to categorize NoteBook in any existing software genre. The description preferred by Millennium, "information processor," seems too vague. Ultimately, NoteBook is the place you clip and save unstructured information from any source. With its tools for organizing, searching, and reassembling that information into new forms, it serves as a briefing book, a meeting mediator, a personal- or group-information manager, and much more. Every NeXTmail user will find an immediate use for it as an organizer for archived mail. For many users, NoteBook will serve as a central application kept open on their screen at all times.

NoteBook is presented to the user in the form of – you guessed it – a notebook. It has section markers and tabs, a spiral binding, pages that turn, a cover, and a choice of page styles. Information is organized in outline form, and the program offers all the sophisticated outline tools found in a program like Lighthouse Design's Concurrence.

But NoteBook outlines have a difference. Each item in the outline is a separate cell that can have its own attributes – labels, dates, priorities, and more. Thus, outlines can be sorted or entire notebooks searched based on any cell attribute. Any kind of data – rich text, graphics, files, and folders – can be dragged and dropped into a cell.

All information in a notebook is automatically indexed by multiple attributes, so it is easy to retrieve data even if you can't remember when and where you entered it. The index can be included under an Index tab, or you can search for information using a powerful Mark and Gather panel. Cells can also be linked across pages.

A variety of other tools for managing labels and templates, customizing the display of pages, placing bookmarks, and creating page bundles to share with other users extend the power and usability of the product.

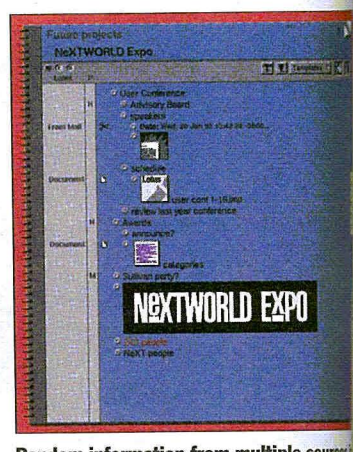
Performance was more than acceptable, even with complex searches through moderately large notebooks. The program fits well the overall NeXT environment, admirably implementing NeXT's direct-manipulation model. It provides a Clipping feature in the Services menu for other NeXTSTEP applications and uses color extensively but tastefully. The documentation and example files provided are informative and complete.

There is little to dislike about NoteBook. Despite the option for page bundles, NoteBook is not really a collaborative application since only one user can have a notebook open at a time. To really make it a tool for group interaction, Millennium needs to produce a true multiuser version.

My other wish is not something Millennium can provide by itself. NoteBook would really shine on a portable computer, for which it could be the primary interface. Such a combination would begin to approach the functionality of systems like Go PenPoint computers which also use a notebook metaphor as the central organizing principle. Millennium should work to make a simplified version of its interface for the pixel-poor 640-by-480 laptop screen size.

But even chained to our desktops, NoteBook is a one-of-a-kind tool that will find almost as many applications as there are users.

DAN RUBY *is* NeXTWORLD *editor in chief.*

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# The P

## *Lighthouse whiteboard*

*by* BEN CALIC

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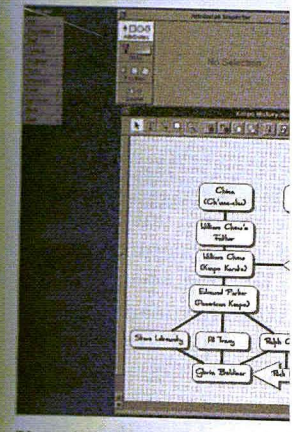

**Digram!2 features a new tool ribl default landscape mode.**

"old" way of doing things hard fans of the original p

Diagram! is hard to c Lighthouse describes it as purpose, structured graphi a "digital whiteboard." users find it a very comfort gram for creating charts, flow diagrams, or any gra which text is used.

### Diagram!2

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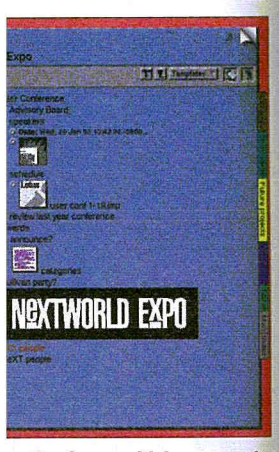


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UBY *is* NeXTWORLD's
*chief.*

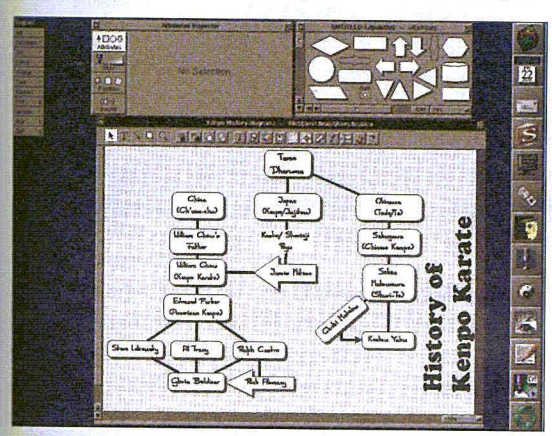


# The Power of 2

## *Lighthouse Design's digital whiteboard is now twice as nice*

*by* BEN CALICA

Diagram! reigns as one of the most widely used applications on the NeXT platform, with the largest installed base of any nonbundled application, according to its publisher, Lighthouse Design. Now, the company has followed up with Diagram!2, a dramatically improved version that sports new features and a user-interface layer, while retaining the "old" way of doing things for die-hard fans of the original product.




**Digram!2 features a new tool ribbon, enhanced inspector, and default landscape mode.**

Diagram! is hard to classify. Lighthouse describes it as a general-purpose, structured graphics tool or a "digital whiteboard." Many users find it a very comfortable program for creating charts, graphs, flow diagrams, or any graphic in which text is used.

### Diagram!2

*A substantial upgrade to the popular "digital whiteboard" that incorporates arbitrary text and graphic rotation and a revamped user interface. Although almost too unstructured, still a big winner. Highly recommended.*

**$499**

*Lighthouse Design, 2929 Campus Dr. #250, San Mateo, CA 94403. 415/570-7736, 800/366-2279.*

The latest version is the result of more than 2000 proposals sent in from the product's electronic suggestion box. Experienced users will notice three things immediately: A new tool ribbon makes major program features immediately accessible; an enhanced inspector permits direct manipulation of graphic and text elements; and the default page layout is now in landscape mode, matching most people's use of the program.

Diagram! has a palette of drawing tools that resembles a cookie-cutter template of basic shapes. Either drag a shape off the palette or draw directly with the form using the program's nifty new Tools and Attributes panel. Drag a connecting line between two shapes and you're charting. The lines stick to chart elements through what Lighthouse aptly calls "rubberbanding," so as you move Aunt Millie next to Uncle Bert, her connection to Grandma Rose follows along.

Each shape can be resized, rotated, or given a drop shadow. A unique find feature lets you select all the graphics of a particular shape, so they can be manipulated together. If you create a graphic that you want to reuse, it can be added to your own custom palette.

It is easy to add a text label to a shape by double clicking. You have a lot more control over text in this release, with new features like arbitrary rotation of the text, a Find panel, and spell checking. Also, you can tab from one shape to the next to add text, removing a point-and-click hurdle from the last release.

Files, external graphics, and sounds can also be attached to your diagram. For example, a flow chart could reference Mesa spreadsheets or a DataPhile database. A link-management system lets you find existing links or cut them completely so a document can travel alone.

The program is almost completely intuitive, giving an edge to occasional users who have a project to get done. But figuring out how to get the most out of the program takes a little time: It's not obvious, for example, how to add points to a line. (You must drag a point object off the graphics palette.)

Lighthouse has revamped the file format into an easily readable list. This allows programmers to write custom applications that interact directly with Diagram! files. This kind of interoperability, combined with Object Linking, gives NeXT users a giant advantage over other platforms in creating entire custom environments consisting of both custom and shrinkwrapped software. In fact, Diagram!2 is the first shipping NeXT application to act as both a source and destination for Object Linking.

On the down side, a few features are missing. While you can import any graphic, all polygons are constrained by the rectangle that bounds them. So you can stretch a triangle all you want, but you can't mess with any of its points. The program lacks features for creating automatic charts in different styles, which a standard organization-chart program would normally have. Also, the inability to align objects around one that has been locked in place is inconvenient.

I would also suggest expanding the tool palette to include more operations. I can see a lot of mouse clicks saved by putting, say, the 25 most-used operations on the palette.

Most of these criticisms are nitpicks. The software felt good to use and it was easy to create great-looking results. In general, if you need to create charts and graphs that use a lot of text, Diagram!2 is for you. We recommend the upgrade to existing and new users alike.

BEN CALICA *is a contributing editor to* NeXTWORLD.

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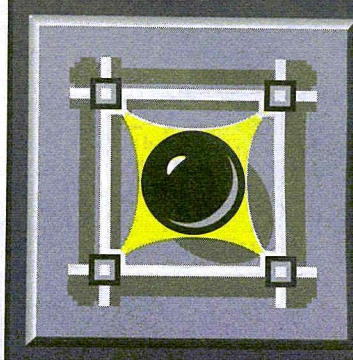

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**Circle 75 on reader service card**

# Quark Killer?

## *Well, not quite yet – PasteUp aims high but only partly delivers*

*by* TONY BOVE *and* CHERYL RHODES

Remember way back in 1988, when NeXT declared its new computer to be the best platform for desktop publishing? It was a hard sell, considering that NeXT boasted a single publishing program – FrameMaker – a tool more appropriate for processing books than designing pages. There was no equivalent to Macintosh programs such as Aldus PageMaker and QuarkXPress.

Now it's 1993, and the arrival of PasteUp from RightBrain Software brings the promise of NeXTSTEP desktop publishing much closer to reality. While the program largely succeeds in combining some of the power of QuarkXPress (such as the ability to rotate text blocks and any other object) with the ease of use and flexibility of PageMaker, PasteUp does not offer the extensive typographic control of either program. Furthermore, the 1.1 version that we reviewed was sluggish and flawed by minor bugs. RightBrain promises to improve the program during the coming year. In the meantime, the program is certainly usable and offers a few significant advantages over its Mac cousins.

### Bag of tricks

PasteUp can open multiple documents and display multiple views of a single document (at up to 1600-percent magnification). Once you're editing, almost everything is manipulation and drag and drop. Colors, paragraph styles (named collections of text attributes), and graphic styles (named collections of line and fill attributes) can be dragged from panels and dropped on objects.

PasteUp's tools are like a bag of tricks that can be applied to any object in any combination. Any object can be grouped, scaled, skewed, moved by a specified offset, rotated, or given a drop shadow. Objects can also be locked, so attributes and position aren't changed.

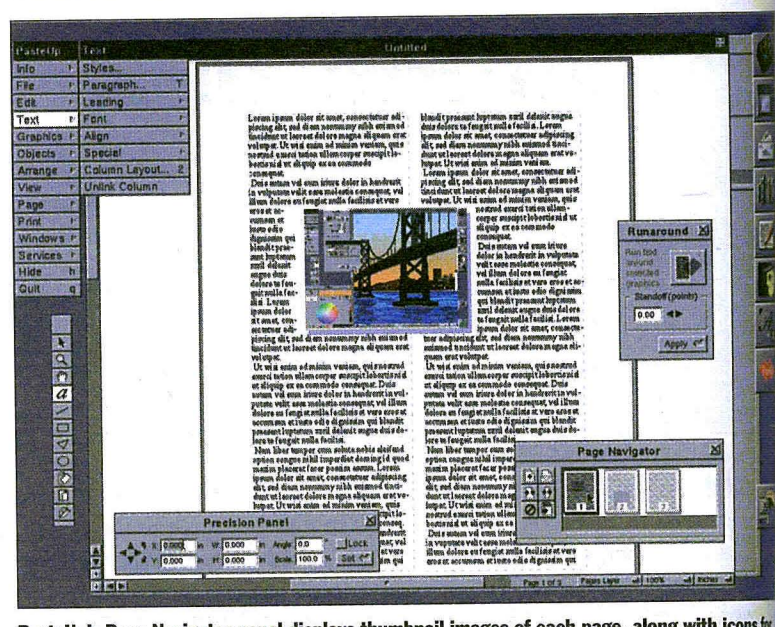
### Working with page elements

PasteUp feels like QuarkXPress in its control over detail, but with PageMaker's freedom of movement – the flexibility to drag elements as you wish. The Page Navigator panel displays thumbnail images of each page; icons let you add, delete, collapse, or expand pages; create new views; and print.

PasteUp has a Master Layer for placing objects repeatedly on every page. You can switch between this layer and layout pages, or show the Master Layer as a dimmed background while editing pages. It provides a Precision panel for altering the position, scale, and rotation angle of any object, as well as a Runaround panel to define how text wraps around graphic objects.

The program lets you drag and drop EPS graphics, TIFF images, faxes, and other files, and then treat them as objects. Dragging and dropping imports placed files by reference, without copying the file's contents into the PasteUp document. The Links panel lets you replace one imported file with another.

Another feature we like is the Align/Distribute function, which lets you align the edges, tops, bottoms, or centers of objects. You can distribute objects horizontally or vertically so that their centers or edges are equidistant.




**PasteUp's Page Navigator panel displays thumbnail images of each page, along with icons for adding and deleting pages, collapsing and expanding pages, creating new views, and printing. The Precision panel alters on the fly the position, scale, and rotation angle of any object.**

You can copy and paste objects or just their attributes (color, location, line, fill, width, height, scale, rotation, and so on). You can use Copy Attribute with text blocks, copying fonts, character and paragraph specs, and text styles.

### Working with text

PasteUp makes it easy to draw text columns and edit text. You can use the Text tool to type nonwrapping headlines that expand horizontally to fit the type or to create text blocks with wrapping text, which can be placed from a file. The editing functions work the same as with most NeXT word processors.

Columns can be set automatically in the Column Layout panel, with settings for space between columns, column height, and margins. Columns can be linked in the Master Layer or manually from page to page, but the automatic linking is awkward. You can create multiple auto-flow columns in the Master Layer, but they must be linked into one flow. In this regard, PasteUp is not as flexible as PageMaker or FrameMaker, which can flow text in multiple columns over multiple pages without the need to link them beforehand.

Tracking, leading, and word spacing can be set in either the Font panel or the Paragraph panel. Automatic kerning and hanging punctuation are provided for, along with control over the spacing before and after paragraphs.

### The results

RightBrain saved finishing its text engine for last, and it shows. While the engine is powerful, it is slow and buggy. For example, PasteUp's Smart Quotes feature automatically replaces letters like "fi" with the appropriate ligature; unfortunately, in version 1.1, the ligature replacement is not reversed when the word is being edited. On runarounds, the text sometimes failed to rewrap after we moved a TIFF.

On the output side, PasteUp performs admirably with NeXT printers, and it can prepare color-separated pages. PasteUp supports Adobe Separator's compatibility guidelines for overprinting.

PasteUp's documentation is sparse – it includes virtually no explanation of options and settings in panels – and it lacks a serviceable index. The package needs a few sample documents and templates.

In general, PasteUp performs adequately but not flawlessly. We can overlook its problems for now for short documents needing dynamic layout, PasteUp is far better than FrameMaker. It brings unique features to the table and takes advantage of the power of NeXTSTEP. RightBrain has aimed high and even if they fall a little short, we're happy to have such a program finally appear.

TONY BOVE *and* CHERYL RHODES *are contributing editors to* NeXTWORLD.

### PasteUp 1.1

*PasteUp has an innovative approach to page layout, combining the power of NeXTSTEP, the control of Quark, and the freedom of PageMaker. But the program is sluggish and suffers from a variety of minor bugs and annoyances.*

**$795**

*RightBrain Software, 132 Hamilton Ave., Palo Alto, CA 94301. 415/326-2974, 800/472-7246.*

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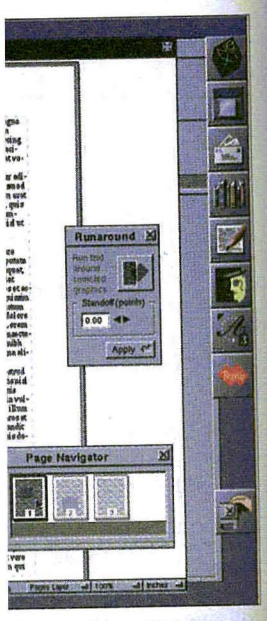


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OVE *and* CHERYL
*are contributing editors*
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# Mesa™

*The NeXT™ Plateau in Spreadsheets*

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*- Vince Jordan - Director, Software Development, WilTel*

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**Circle 64 on reader service card**

# Computer Dating

Programs that keep track of day-to-day information like appointments and to-do lists often force users to conform to a particular way of doing things, causing many to revert to their old paper-based systems. Pencil Me In from Sarrus Software takes a more flexible approach, blending the ease of using a real date book with electronic advantages such as automatic reminders, instant updating, and the ability to roll over to-do items to the next day.

Instead of entering events in a dialog box, you type directly into the date book itself, without having to worry about assigning an event type: Events are catalogued as either appointments or action items. While appointments are tied to a specific time and date, action items float from day to day until completed. You can also assign a due date, after which a detail will appear on a list of overdue items. Descriptions can be as long as you like, and rescheduling an appointment is as simple as dragging it to a new time slot. The flip side to this free-form approach, of course, is that it isn't possible to sort events by type or to prioritize items on your to-do list.

This combination of user control and computerized assistance is also apparent in the program's handling of scheduling conflicts. You are alerted to conflicts but given the option to override; the conflict can remain in the calendar. Alarms can alert you to an appointment (but not an action item) by message panel, e-mail, or sound of your choice, although Pencil Me In must be running and your calendar open in order for the alarms to function – a major drawback. Sarrus should provide a background daemon that monitors alarm settings.

Pencil Me In's handling of workgroup-scheduling tasks is less powerful than Adamation's What's Happening? (see "Office Manager in a Box," *NeXTWORLD*, Spring 1992), but for smaller workgroups it may suffice. Pencil Me In's approach takes into account the distance that may exist between individuals in a workgroup, either geographically or because of an organizational hierarchy. On-the-fly workgroups can be established by using e-mail to send appointments to other users. These appointments can be dragged into a user's calendar, with all settings and attributes intact.

The secret to Pencil Me In's success in providing groupware features is that all calendars are the same; a group calendar is simply a calendar that subscribes to several others, and your personal calendar becomes a shared calendar when you permit someone else in your workgroup to access it.

Pencil Me In has an excellent user interface, which looks just like a DayTimer-type address book. Sarrus should go even further and allow you to personalize your calendars with different fonts, colors and icons. A banner feature, for blocking out events that span more than one day, such as trade shows or vacations, would also be welcome. Lastly, you can customize the size of your printout, but the program lacks preset formats for standards like DayTimer, DayRunner and Filofax, so you'll have to measure the pages first.

No computerized calendar will meet the needs of all users, but if you have moderate, relatively standard scheduling needs, you should make a date with Pencil Me In.

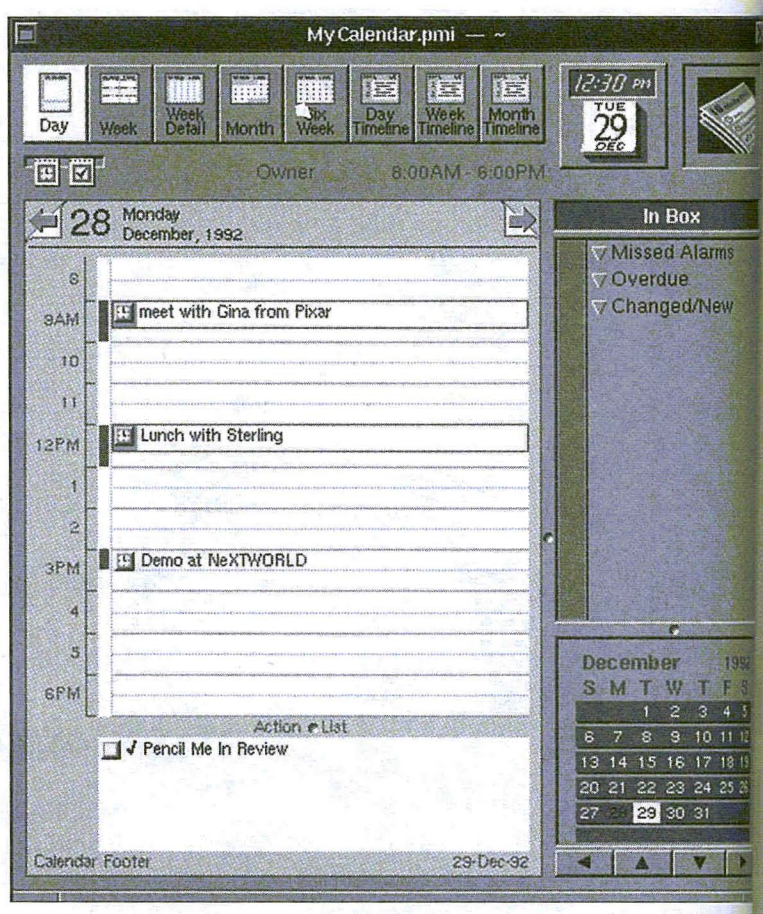
*by* LEE SHERMAN

## Pencil Me In

*Easy-to-use personal scheduler that scales up for use by small workgroups. While more flexible than most, Pencil Me In could be improved by providing more personalization options like font selection, icons, or banners.*

**$300 per user**

*Sarrus Software, 777-C Woodside Rd. #101, Redwood City, CA 94051. 415/306-2495.*




**Pencil Me In's interface mimics that of a date book but takes advantage of NeXTSTEP features. The selected appointments, represented by the icon in the file well, are ready to be dragged into another user's calendar or sent by e-mail.**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**Circle 5 on reader service card**


# Budget D

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## Fiscal Dimension 1.

*Although billed as NeXTSTEP's sonal-finance application, Fisca sion has more in common with books than with checkbooks. C tle effort, it will fit the bill, but interface remains a liability.*

**$249**

*AXSYS, P.O. Box 1184, Bala C PA 19004-1184. 215/667-6822 215/667-2654 fax; e-mail: info@axsys.com.*



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SIMSON0000152G



# Budget Deficit

If you haven't yet discarded your PC or Mac because you're waiting for a NeXTSTEP personal-finance program, you're going to face a dilemma. Fiscal Dimension, $249 from AXSYS, is here, but you'll sacrifice features and convenience if you want to use this software to manage your money. And you might not like its interface quirks.

Fiscal Dimension puts a NeXTSTEP face on the chores of keeping a checkbook and tracking expenses. It enforces the discipline of double-entry bookkeeping, which reduces the chance for error but increases the work. Most Mac and PC programs, though, do a better job of casting accounting chores in the guise of familiar metaphors like checkbooks. Fiscal Dimension uses a panel that looks like a check for entering transactions, but other than that, there are very few cues to orient the new user.

Experienced bookkeepers will be more comfortable with Fiscal Dimension. Allow about a day to get started – you'll need to set up a chart of accounts and input any past transactions you want to record (Fiscal Dimension cannot import files). The program offers little explanation about how to organize your accounts, apart from a set of sample books, which are sorely needed to supplement sparse on-line manual.

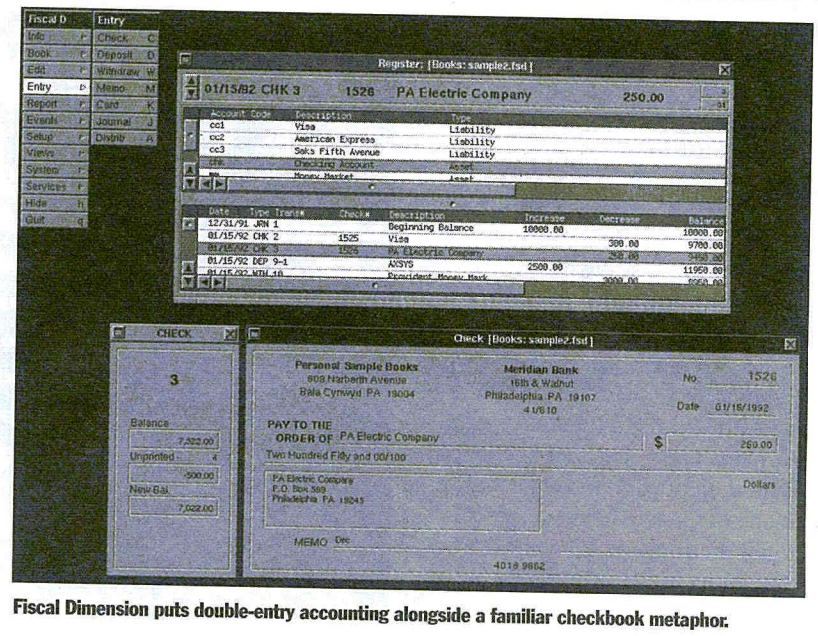
Fiscal Dimension allows sophisticated control over budget categories, including allocating expenses to subaccounts; you might, for example, track expenses by project as well as tax category. Reporting is less sophisticated. Standard accounting forms such as Trial Balance are available, but these reports are intended to be printed only and cannot be manipulated on-screen. Nor is there any way to adjust the format of the reports – they print in eight-point type, whether you want that or not. And they output to NeXT printers only – program flaws prevent Fiscal Dimension from printing to non-NeXT PostScript printers.

In addition, the interface is quirky. We discovered that an automatic-entry feature worked well – until we edited a transaction. The automatic-entry feature disappeared during editing, leaving us with extra keystrokes as our only option. Furthermore, Fiscal Dimension doesn't adhere to NeXTSTEP interface conventions: New windows completely hid existing windows, and a split-view window that showed a list of accounts and transactions in each account could not be resized until we'd filled both its halves. Finally, we dearly wished for a home window, such as a checkbook register, that would provide a point of reference when we opened a new set of books.

To Fiscal Dimension's credit, the application handles a complex set of accounts and subaccounts well. Users report that AXSYS provides excellent technical support and quick fixes for reported bugs. Future versions of the application will assist small businesses with support for requirements like aging of accounts receivable and invoicing, but for users who expect the features of personal-finance applications on Macs or PCs (such as tax estimating, financial planning, investment management, graphs, or even automation of recurring entries), Fiscal Dimension may prove a disappointment.

Fiscal Dimension fills a need, but its lack of attention to interface design and a limited feature set is a current liability.

*by* DANIEL MILES KEHOE




**Fiscal Dimension puts double-entry accounting alongside a familiar checkbook metaphor.**

## Fiscal Dimension 1.0

*Although billed as NeXTSTEP's only personal-finance application, Fiscal Dimension has more in common with ledger books than with checkbooks. Given a little effort, it will fit the bill, but a quirky interface remains a liability.*

**$249**

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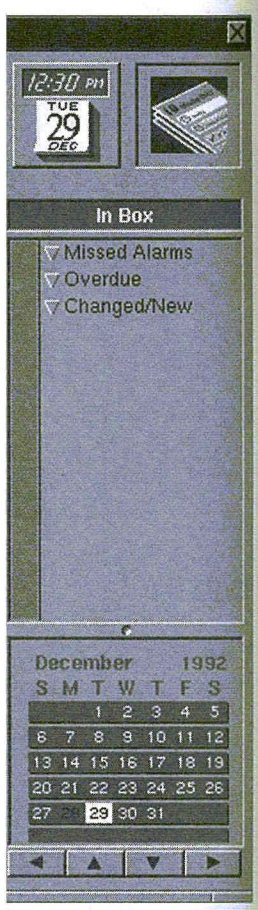


**itage of NeXTSTEP features: are ready to be dragged into**

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SHERMAN

# Reviews Desk

**Here in reviews central we're seeing an interesting trend: What would be parts of larger utilities packages on other platforms are shipped as a flurry of smaller stand-alone products on NeXTSTEP. This is possible because applications work together so well under NeXTSTEP, while the equivalent tools for other systems can't rely on the operating system for such seamless integration. Another encouraging trend is the arrival of new offerings that fill gaps in the NeXT product portfolio. Included this month are the excellent international spell checker from HSD and the pressure-sensitive graphics tablet from Wacom.** – DAN LAVIN

*This month's gang:* SIMSON L. GARFINKEL (SLG), LEE SHERMAN (LS), RICK REYNOLDS (RR), *and myself,* DAN LAVIN (DL).

## HSD Spell

**$195 for English and one other language; $99 each additional language**
*HSD Microcomputer U.S., 1350 Pear Ave., Ste. C, Mountain View, CA 94043. 415/964-1400, 800/828-5522.*

HSD has successfully navigated the tricky waters of providing an upgrade to bundled NeXT software – in this case, the spell checker. Spell has enough added functionality at a low-enough cost to make it a win for many users. The HSD-enhanced English dictionary and your choice of one of the ten included international dictionaries are enabled by your initial license; additional languages, at $99 a pop, are just a phone call away. If an application uses the NeXT text object, using Spell is as simple as using the built-in checker: You just change a pull-down menu in the Spelling panel. Other applications, notably WriteNow, require that you use Spell from the Services menu. In our tests, Spell was superior to the NeXT English dictionary. The German dictionary we used correctly identified several subtle errors in spelling and capitalization. **DL**

## SoundHouse

**$69**
*MIDIapolis Systems, 3208 W. Lake St. #133, Minneapolis, MN 55416. 612/822-1604.*

SoundHouse, an inexpensive sound-recording program, is a welcome companion to NeXT's internal microphone. Recording is limited to 8KHz – telephone-quality sound – but you can also use the program for simple cut, copy, and paste editing of existing sound files, up to full-CD quality. Newcomers to digital audio will like the easy-to-operate transport controls. Professionals will appreciate the accurate sound meter; ability to adjust the volume of left and right channels independently; and information display about a sound's size, length, number of samples, number of channels, sample format, and rate. If you don't require the advanced mixing and effects capabilities found in higher-priced products, SoundHouse is a bargain. **LS**

## VirtSpace 3.0

**$30**
*Pinnacle Research, 4725 E. Sunrise Dr. #435, Tucson, AZ 85718. 602/529-1135.*

## Desktop v1.1

**$30**
*Johnson Sieu, P.O. Box 367, Berkeley, CA 94701-0367.*

Screen too small? These two programs each make your NeXTstation's MegaPixel Display a window onto a much larger screenscape. The more sophisticated of the two is VirtSpace, a $30 program from Pinnacle Research. VirtSpace creates a screen window filled with little rectangles that correspond to each window on your screen. By dragging these rectangles, you can drag your real windows. By default, the VirtSpace window is four times the size of the NeXT screen, but you can resize it to be as big as you want. You can also simulate a multimonitor system by setting up VirtSpace to automatically scroll or jump from screen to screen when you move the mouse over the edge. Desktop v1.1 is similar to VirtSpace but lacks many of its nicer features. The interface is clunkier and omits some crucial elements. Both these programs take some getting used to; many users will prefer to use NeXTSTEP's ability to hide applications and turn windows into icons. But for people who want to have a simulated larger screen, we can recommend VirtSpace. **SLG**

## Wacom SD-431D Digitizing Tablet and Pressure Sensitive Stylus

**$1095**
*Wacom Technology Corporation, 501 S.E. Columbia Shores Blvd. #300, Vancouver, WA 98661. 206/750-8882.*

For most NeXT users, the only pointing and drawing option has been the mouse. Successful on other platforms, Wacom is the only tablet available that boasts a combination of cordless stylus, pressure sensitivity, and battery-free operation. It changes the way you work by giving your illustrations a more natural, less-computer-generated feel. This 12-inch-by-12-inch tablet has a standard power cable and connects to your NeXT serial port. It comes with your choice of one pointing device (either of two pressure-sensitive pens, two nonpressure-sensitive pens, or a four-button cordless cursor). No software is needed, though it requires NeXTSTEP 3.0. The device is especially useful in conjunction with programs, such as Altsys Virtuoso, that are aware of its presence and can produce variable-weight lines depending how hard the user presses the stylus. **RR**

## PageChain

**$129**
*Pinnacle Research, 4725 E. Sunrise Dr. #435, Tucson, AZ 85718. 602/529-1135.*

If you routinely fax pages created in multiple applications, you'll appreciate PageChain's single-minded ability to merge documents so they can be sent in a single fax or e-mail session. The program accepts any TIFF, EPS, or PostScript file and spits out a composite PostScript file that can be viewed with Preview, faxed, or printed. You can't edit the resulting document, but it can be sent to others without worrying about whether they have the application required to open the file. The software works as advertised, but its bare-bones interface could be improved with the addition of more control over the scaling and rotation of individual pages. **LS**

## ArtBursts: Icons+

**$109**
*MIDIapolis Systems, 3208 W. Lake St. #133, Minneapolis, MN 55416. 612/822-1604.*

ArtBursts: Icons+ is a collection of over 4000 icons in EPS and TIFF format that can be added license-free to your custom applications or simply used to personalize your workspace. There are a few gems in the rough but unfortunately the amateurish style used throughout is more suited to shareware than a commercial package, and none of the icons are offered in color (an oversight MIDIapolis says it will correct in a future release). In the hands of a truly talented artist, this could have been a treasure trove for NeXT developers. **LS**

## Dark Forest

**Free**
*Found on archive servers and CD-ROMs by NeXT employee Garth Snyder*

We don't normally review freeware, but the excellence of Dark Forest makes it an exception. This utility lists folders in a given disk or directory in descending size order, quickly identifying your space hogs and allowing you to delete or archive them. For example, it gives you the size of your active mailbox along with the size of enclosures, normally a tedious task. Though only a wrapper for UNIX commands, Dark Forest is nearly perfect in its implementation. Loses half a cube only due to support issues arising from the software. Everyone should own a copy of this product. **DL**

GREAT NEW PRICE!

When you purchase a NeXT computer, one E High Density dis comes with it.

The only F disk good enoug the NeXT gener of computers.

Toshiba's H High Density dis 2.88MB of *forma* storage (4MB *un*

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# Make Toshiba Your NeXT™ Disk.

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When you purchase a NeXT™ computer, one Extra High Density disk comes with it.

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# The Place to Go For Whatever's NeXT.

**You can think of us as your NeXT purchasing department.**

There are all kinds of companies making products for the NeXT market. From three-person start-ups to mega-corporations that have been dominant forces in the PC and Mac markets for years. That makes things exciting and sometimes a little confusing. Because each company tends to have different policies and procedures.

Fortunately, we have relationships with all these companies. And we buy in quantities that, well, gives us a bit of clout. Which means that whether you're looking for one copy or a company-wide purchase, we can help you get the best possible deal.

In fact, we recently established a ***Corporate Account Support Program*** for businesses, schools, government agencies, and anyone else who buys in large quantities. We provide an up-to-date product list every month complete with the latest version number, list price, our price, and MBG (Money-Back Guarantee) information.

*Chuck Milliken,*
*NeXTConnection Corporate Sales*

**And you can also think of us as your NeXT consultant.**

When you need to make a volume purchase we will negotiate the best deal for you, be it a site license, volume discount, or special educational price. And, no matter how many products you order, you get all our legendary services!

***One-stop shopping.*** We have the largest variety of NeXT software and peripherals anywhere.

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***Everything Overnight®.*** All non-COD, in-stock orders phoned in by 3:00 a.m. are shipped overnight for just $3.

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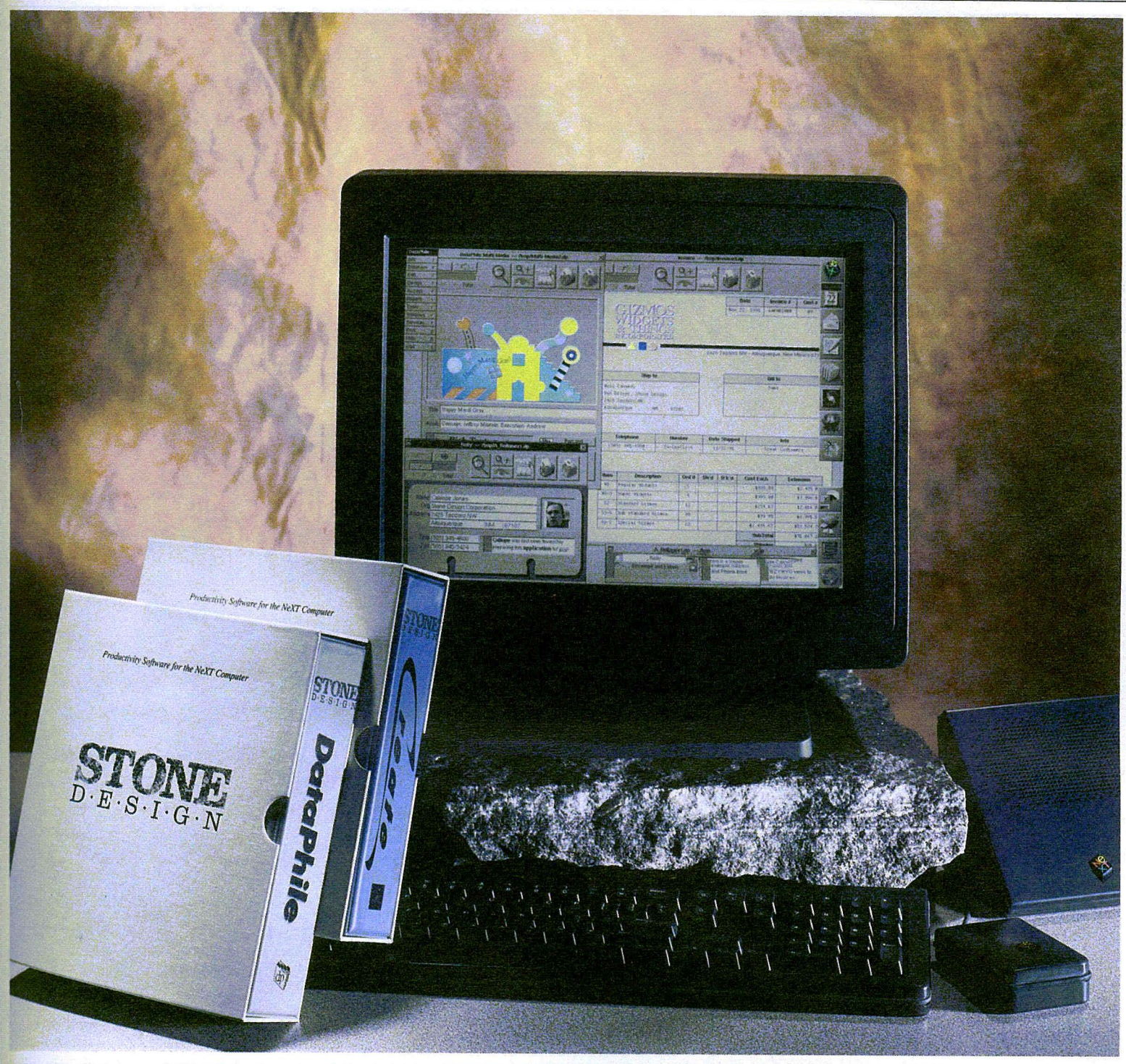


# WHY MAKE THINGS DIFFICULT?

## STONE DESIGN

**At Stone Design, anyone can deal with data.** Most people and businesses don't need the complexities of relational databases. Especially when they can have a sophisticated flatfile like **DataPhile** on their NeXT.

The simple visual interface makes quick work of creating a custom database. Default values and entry lists make manual data entry a snap and DataPhile can also incorporate data from an existing text file. (Databases can include graphics and sounds, too.)

With the default view you can start entering data immediately. Or design custom views complete with specific fields, multiple records, labels, graphic elements, rules, grids, and more.

When it's time to search or sort for reports, "btree" technology keeps the speed high, and user-specifiable field indices give you a wide range of sorting options.

**And create dazzling drawings.** You'll be sending those designers running for cover when you start to **Create** your own high-impact logos, display text, and graphic designs with this powerful color draw program.

The extensive tool palette lets you develop a wide variety of objects (circles, ovals, rectangles, beziers, freehand shapes, and more) with or without text. "Inspectors" help you modify line characteristics, choose fill colors and patterns, and skew, scale, rotate, align, etc. Create includes all the powerful text effects of Stone Design's popular **TextArt** including kerning and font controls.

Layout tools include grid and ruler controls, multiple zoom views, object grouping, alignment, and more. And you can use it with DataPhile to create a compact database for graphics.

Whether you want to design logos or enhance your reports, Create puts PostScript draw power within reach.

**Stone Design, Inc. ... 30 day MBG**

| | | |
|---|---|---|
| 1637 | Dataphile 1.04 | **$529.** |
| 1066 | Create 1.1 | **395.** |
| 8658 | TextArt 1.0 | **229.** |

**Call 800-800-NeXT to order.**

NeXTConnection™

# DRAWING ON THE POWER OF NeXTSTEP.

## DIAGRAM! 2.0

**Finally, a drawing tool that lets you think and draw. At the same time.** If your work revolves around whiteboards, business drawings, or technical graphics, **Diagram!** is a life-saver. Based on a revolutionary and much-imitated "drag and drop" drawing metaphor, Diagram! 2.0 offers a new way of creating and revising information graphics: pictures and drawings that communicate ideas and information.

Just drag shapes off of pre-set drawing palettes, and you'll be ahead of schedule from square one. Create your own palettes, and they'll be a mouse click away in Diagram!'s "Palettes" menu. With Diagram!'s "rubberbanding," lines and labels drawn between objects are automatically redrawn when the objects are moved, saving hours of time and tedium. Simply put, Diagram! offers a faster and smarter alternative to drawing programs built for artist and illustrators.

Now in its second release, Diagram!'s enhancements include arbitrary rotation, Hot Linking to any NeXTSTEP application, an extensible "Palettes" menu in which you can display and retrieve custom palettes, and a documented file format, giving developers easy access to the information underlying many CASE or technical graphics. There's also infinite undo and redo, line labels that "know" where they belong, a button ribbon for easy access to Diagram!'s five drawing modes, simple table editing, and a whole host of other features too numerous to list.

Because information graphics are seldom just pretty pictures, Diagram! lets you reference background information from your drawings. With just a simple drag and drop, business drawings can reference financial statements, or screenshots from your custom applications can reference training documents. And sound annotation brings the voice of reason to the most complex drawings. You can even generate Diagram! drawings using its documented file format.

All in all, Diagram! is drawing on the power of NeXTSTEP.

**Lighthouse Design, Ltd. ... 60 day MBG**
8686 Diagram! 2.0 *(requires NeXTSTEP 3.0)*..... **$395.**

Latest versions only.

POWE

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**"Worth the price of a NeX**
Barlow described **Concurre**
NeXTSTEP's first general-pu
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'92 NeXTWORLD Expo. Cre
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Concurrence's outliner is
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outlines. Plus, with the built
topic formatting features, yo



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# POWERFUL PRESENTATIONS COME TO NeXTSTEP.

## CONCURRENCE

**"Worth the price of a NeXT all by itself."** That's how John Barlow described **Concurrence** (*NeXTWORLD* Spring '92), NeXTSTEP's first general-purpose presentation and outlining application, and one of the major highlights of the January '92 NeXTWORLD Expo. Created by the same team behind the best-selling *Diagram!*, Concurrence is the tool for anyone in the business of communicating through presentations.

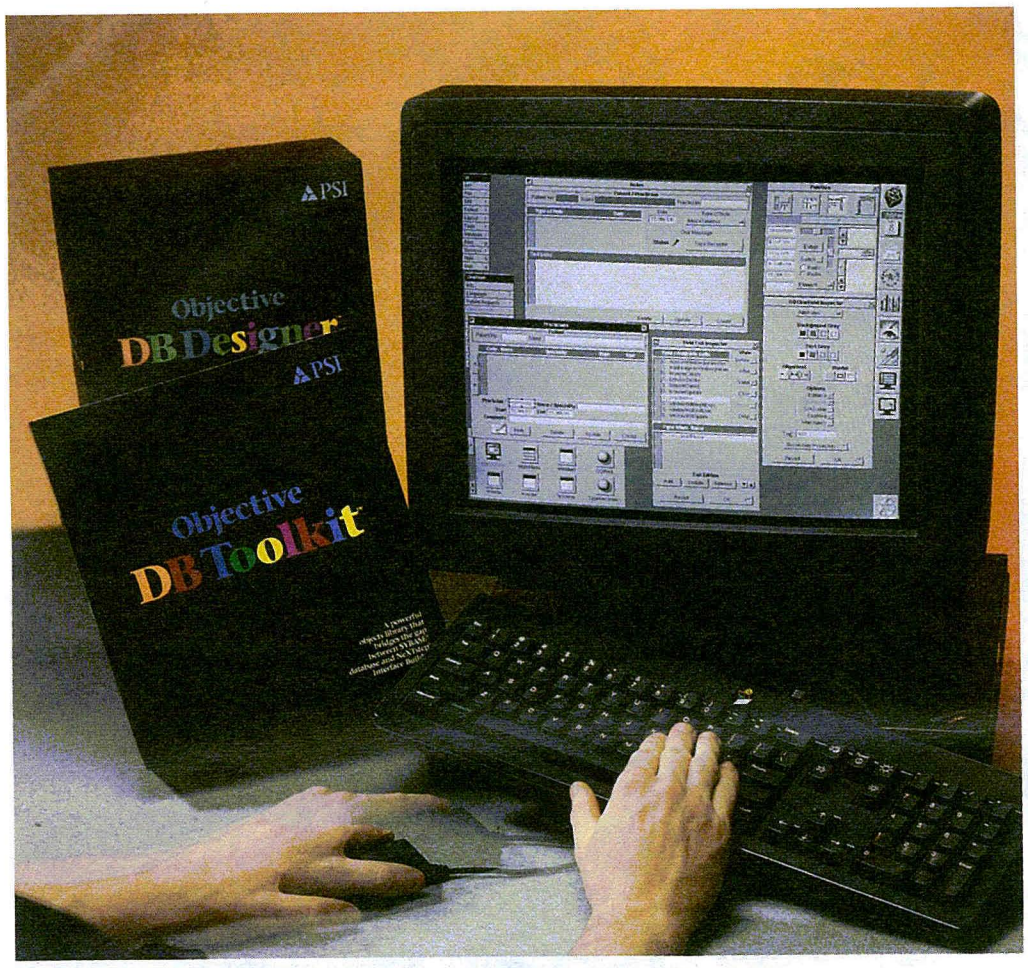
Concurrence's outliner is built for brainstorming. The collapse and expand capabilities, drag-and-drop text, rulers, and labels make it a breeze to create even the most complex outlines. Plus, with the built-in spell checker and automatic topic formatting features, you can get professional-quality results immediately. You can even use multiple views to create several versions of the same outline, and modify them all simultaneously!

Just push a button to hot-link a presentation to your outline. With its voice-overs and drag-and-drop graphics, Concurrence makes multimedia presentations on your NeXT a reality today. To bring the true power behind NeXTSTEP to your Concurrence presentations, add file links from other applications (such as Diagram!) and choose from an impressive array of transition effects. You can also create multiple versions of the same presentations, using different fonts, colors, and backgrounds—they'll track each other word for word. In no time at all, you'll be preparing high-impact presentations for delivery across your entire organization!

And when it comes to quality output—whether it's viewgraphs, 35mm slides, or overheads—just hook your NeXT to any PostScript output device or send your Concurrence documents via NeXT Mail to one of Lighthouse's qualified service bureaus. As the review in *NeXTWORLD* (Summer '92) put it, "Concurrence is a compelling piece of software that NeXT users won't want to live without."

**Lighthouse Design, Ltd. ... 60 day MBG**
2409 Concurrence 1.1 ..... **$795.**

**Call 800-800-NeXT to order.**




## Professional Software

**Power of Sybase at your fingertips.** Professional software has a complete set of tools free of Objective-C for Sybase applications and databases.

**Objective DB Toolkit** is designed for NeXTSTEP developers who need the power of Sybase but want the convenience of programming in SQL. The rich set of objects in both palettes allows users to develop complex applications with little knowledge of NeXT's AppKit and very little, if any, Objective-C code is required. The Toolkit is straightforward, and has a short learning curve enabling untrained (and trained) developers to design applications in the NeXTSTEP environment much faster and with greater ease.

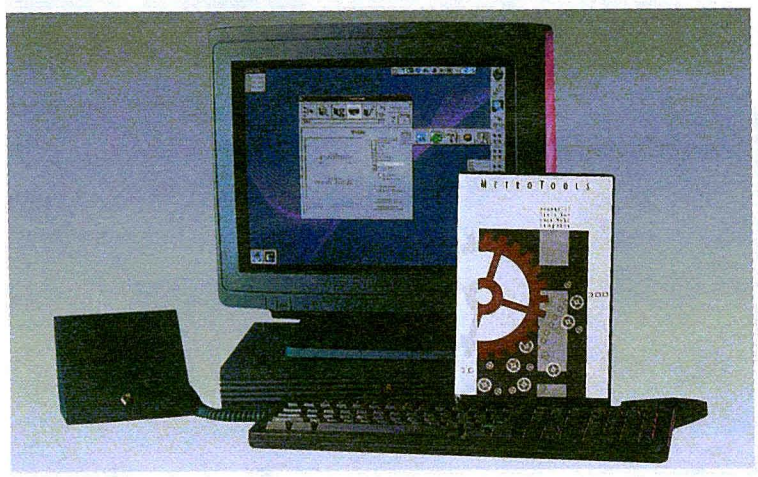
Best of all, the program's ease of use doesn't mean your options are limited. Any field value can be substituted in SQL statements. Internal variables can be used to communicate data from field to field or window to window. Exits can be cascaded in a single field. DB Toolkit is for the serious application developer who needs the power of Sybase without the pain of 3GL coding.

**Get *Objective DB Designer* free with the purchase of the Toolkit.** It's a database design tool specifically for the Sybase engine. The Designer no longer requires you to know or type tedious SQL statements, allowing you to build database tables using only the mouse through a highly visual and Interactive NeXTSTEP-designed interface. Includes a full report writer.

Both the Objective DB Toolkit and Objective DB Designer run on NeXTSTEP 2, NeXTSTEP 3, and NeXTSTEP 486.

**Professional Software**

9357 Objective DB Toolkit 2.2 ..... **$895.**




## MetroTools

**Save your screen, import Mac fonts, find lost files, and more.** The six utilities in **MetroTools** can really enhance your NeXT productivity. Former Mac users will particularly appreciate the Font Installer which provides one-step drag-and-drop installation of both NeXT and Mac PostScript fonts the and Sound Importer which converts Mac sound files to NeXT format.

The NiteLite screen saver uses colorful animations to protect your display from burn-in and prying eyes, and it offers several workspace backdrops. The Application Launcher lets you create up to 32 groups of applications and documents that can be launched by clicking on tiles or mini-icons. The Archiver offers drag-and-drop file compression, decompression, and archiving while the File Locator offers several name-matching schemes to find misplaced files. You can also sort by date, time, owner, and size. As *NeXTWORLD* (Winter 1992) wrote, "...convenience and value recommend this bag of tricks."

**Metrosoft ... 30 day MBG**

8325 MetroTools 1.22 ..... **$69.**

## MIDIapolis Systems

**Inexpensive and powerful. WarpIt** is the Image Transformation application that lets you distort images to create new images and animation. **ArtBursts** are digital art collections like you've never seen—great for adding pizzazz to brochures and applications. **SoundBursts** are CD-quality digital sound collections you can add to presentations, voice annotations, and music scores. **SoundHouse** lets you quickly create voice annotations and music recordings. **DayTripper** is the personal and group time manager that lets you set up appointments and reminders for days, weeks, months, and more. **DigitalRhymes** is a digital library of rhymes to make songwriting less of a chore.

**MIDIapolis Systems ... 30 day MBG**

| | | | |
|---|---|---|---|
| 9736 WarpIt 1.1 | **$179.** | | |
| 10012 ArtBursts: Backgrounds | **89.** | 10013 ArtBursts: Borders & Boxes | **89.** |
| 10014 ArtBursts: Designs | **89.** | 10015 ArtBursts: Icons+ | **89.** |
| 5972 SoundBursts: Effects | **89.** | 6025 SoundBursts: Percussion | **89.** |
| 7141 SoundHouse | **59.** | 10011 DigitalRhymes | **99.** |
| 10044 DayTripper 1.1 | **99.** | | |

**Corporate, educational, and government accounts welcome.**

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# STEP UP TO APPSOFT.

## APPSOFT

**Create inspiring graphics.** With its easy-to-use interface and powerful drawing tools, **Appsoft Draw** is perfect for effective presentations, intelligent forms, illustrious illustrations, and multi-page documents.

The comprehensive tool palette gives you fast and interactive control of lines, arcs, rectangles, polygons, 24-bit color, TIFF and EPS images, and beziers, along with total text control including scaling and rotation.

**Everything you need to combine and retouch photos.** You'll feel like the reincarnation of Ansel Adams and Rembrandt with **Image.** It paints images and airbrushes too—in grayscale or true color. You can adjust contrast, color balance, clone part of an image, or airbrush out imperfections. You can even draw freehand or create a custom mask.

Image is fully WYSIWYG and lets you calibrate your screen to your output device for accurate output.

**Full-featured word processing for NeXTSTEP. WriteNow** keeps the writing simple and intuitive while packing enough power to create professional-looking documents.

Rulers make formatting a snap and you can incorporate all the fonts and graphics you like. There's also multi-column formatting, mail merge, spell checking, footnotes, headers and footers, search and replace, character and word counting, auto-page numbering and date insertion.

Remember, since all Appsoft programs run under NeXTSTEP, you get complete compatibility and true work group productivity.

**Appsoft ... 60 day MBG**

| | | |
|---|---|---|
| 4128 | WriteNow 2.1 | **$159.** |
| 4997 | WriteNow 2.1 *(5 pack)* | **739.** |
| 8685 | Image 1.0 | **749.** |
| 10029 | Image 1.0 *(5 pack)* | **3295.** |
| 4465 | Draw 1.02 | **299.** |
| 7028 | Draw 1.02 *(5 pack)* | **1295.** |

**Call 800-800-NeXT to order.**

E

## Objective Technologies

**Say good-bye to models with out-dated data.** Objective Technologies' **OTProvide** automatically links your database with your *Improv* spreadsheet. Every time you open a spreadsheet, the latest data is imported to refresh the model. With OTProvide you can be confident that your calculations are based on the most up-to-date information. Plus you'll eliminate time-consuming data entry and avoid data entry errors.

**SqlBuddy**, new from Objective Technologies, is the database tool for professionals. It creates a friendly environment for working with relational databases. With it, you can perform database queries and commands and review the results. You don't need to know th Structured Query Language (SQL) because SqlBuddy has an easy-to-use point and click interface. Also try Objective Technologies' developer tools designed to enhance developer efficiency and consistency: *GraphPalette* (to graph data in custom applications), *MathPalette* (to create links to *Mathematica*), *SmartFieldPalette* (to restrict and format input), and *ChooserPalette* (to manage selection lists).

**Objective Technologies**

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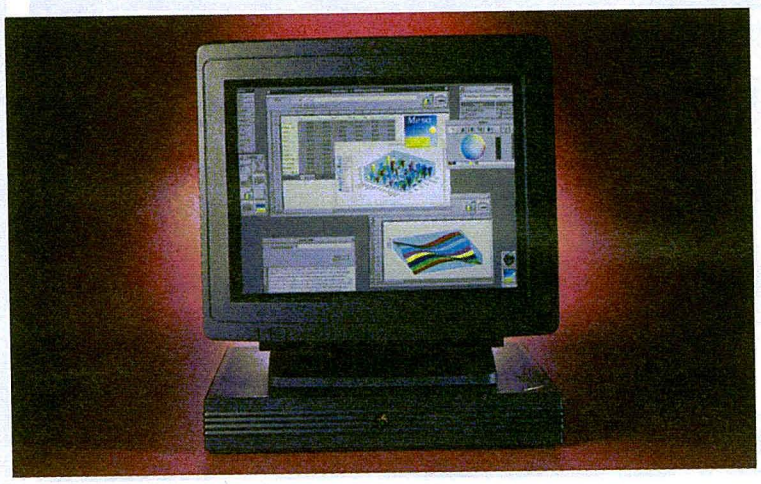
|---|---|---|
| 3282 | OTProvide 1.0 | $699. |
| 7142 | SqlBuddy *(floating license)* | 399. |
| 9344 | [OT Palettes: 2.0] Graph | 795. |
| 9346 | [OT Palettes: 2.0] Math | 795. |
| 9345 | [OT Palettes: 2.0] SmartField | 395. |
| 9347 | [OT Palettes: 2.0] Chooser | 199. |



## Mesa

**MESA—your corporate spreadsheet solution!** Finally an easy-to-use spreadsheet designed exclusively to take advantage of the power of NeXT. John Perry Barlow of NeXTWORLD (Winter 1992) wrote, "If you know either Lotus or Excel, you shouldn't even need to open its manual." New features include 3D graphing capability, full SQL capabilities via DBKit, available real time stock market data feeds, and point and click sheet linking.

Mesa doesn't ignore the basics! It reads Lotus and Excel files. In benchmark tests it preformed over 30 times faster than Improv.

Presentation quality reports—unlimited text and color choices for each cell. Place commands, macros, queries, and reports in a user-definable toolbar. Mesa Object Library allows placement of live spreadsheet views and graphs in custom applications. Infinite number of views. Unlimited technical support.

**Athena Design ... 30 day MBG**

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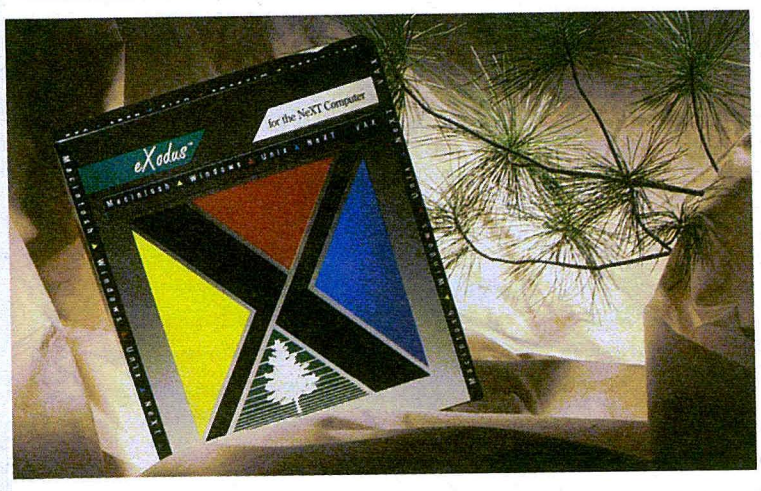
| 8684 | Mesa 1.3 | $395. |




## eXodus

**eXodus leads the way to the promised land of X and NeXTSTEP integration.** Applications using the X Window System are seamlessly integrated into NeXT's remarkable graphical user environment with eXodus. Use it to connect to X applications on any host that supports TCP/IP—Sun, HP, IBM, DEC, etc.—or run X programs installed directly on your NeXT. eXodus allows NeXTSTEP and X apps to run simultaneously, side by side, so you can maximize your NeXT investment and training while saving the cost of additional X terminals.

Version 5.0 of eXodus for the NeXT Computer is based on X11, Release 5 of the X Window System from MIT. New features include complete color support for all NeXT monitors, "rootless" windows and full compatiblity with NeXT Computer's release of NeXTSTEP 3.0. It's easy to install—no special hardware or software is required! And comes with some basic X programs to help you get started. From the same people who developed eXodus for the Macintosh.

**White Pine Software**

| | | |
|---|---|---|
| 6316 | eXodus 5.0 | $239. |

## Insignia S

**SoftPC Professional is the aw solution** that lets you run more tions on your NeXT. "SoftPC Ra important programs for the Ne (4/91). Now SoftPC Professiona VGA, and even Super VGA grap

And now **SoftPC with Windo** the SoftPC family, includes Micr and ready to run with a set of op up Windows.

SoftPC Professional and Softl with *DOS 5.0* pre-installed. Both

**Overnight shipping $3.**



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# OPEN THE DOOR TO DOS.

## INSIGNIA SOLUTIONS

**SoftPC Professional is the award-winning software-only solution** that lets you run more than 50,000 DOS applications on your NeXT. "SoftPC Ranks as one of the most important programs for the NeXT," says *NeXTWORLD* (4/91). Now SoftPC Professional supports protect mode, VGA, and even Super VGA graphics—PC CD-ROMs too!

And now **SoftPC with Windows**, the newest member of the SoftPC family, includes Microsoft Windows 3.1 installed and ready to run with a set of optimized drivers to speed up Windows.

SoftPC Professional and SoftPC with Windows come with *DOS 5.0* pre-installed. Both offer protect mode support, Super VGA, EGA, CGA graphics support, two serial ports, two parallel ports, and PC CD-ROM support. They support both extended and expanded memory configurations and can be configured for multiple hard disks. They both allow DOS access to the UNIX file system.

When it comes to performance, SoftPC and NeXTSTEP make a great team. You can run multiple DOS windows and even run NeXT and DOS software side by side. Sharing files is as easy as cutting and pasting. There's also support for EMS 4.0 expanded memory—in fact, SoftPC can access 32 MB of RAM, enough for even the most RAM-intensive applications. For optimum performance, the recommended system configurations calls for at least 16 MB RAM memory and the fastest processor available.

The power of the NeXT—The application library of DOS—That's SoftPC.

**Insignia Solutions**

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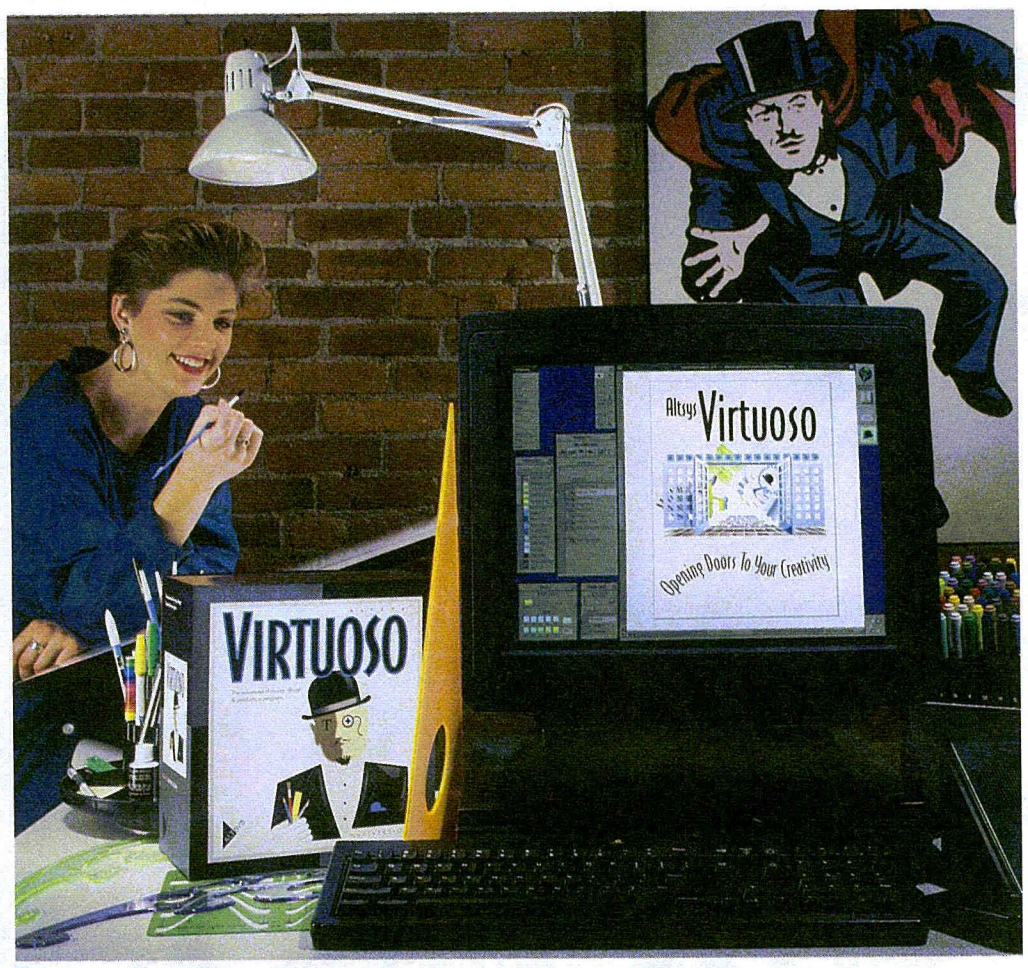
| 1456 | SoftPC Professional | **$329.** |
| 10010 | SoftPC with Windows | **439.** |

**Call 800-800-NeXT to order.**




## VIRTUOSO

**Get professional drawing results with tools from the drawing professionals with the advanced PostScript drawing design and production program, Virtuoso.** As the developer of award-winning graphics programs such as *Fontographer* and *Aldus FreeHand*, Altsys knows what you need most from a drawing program. Altsys has taken their knowledge and experience and combined it with the power of the NeXT to bring you Virtuoso.

You can create artwork free-style with the Freehand drawing tool or import it form the extensive, professional clip-art library. Draw basic shapes and lines with the rectangle, oval, and straight line tool, or get fancy with the Multigon and Pen tools. Rotate, reflect, scale, and skew objects quickly and easily. Autotrace scanned images with superb control.

Virtuoso also gives you the editing, coloring, and organization tools you need to create your designs. Undo or redo—not just the last few actions, but up to 100 levels. Zoom in or out—not just 100% or 200%, but up to 1600%. Choose spot process colors from the NeXT Color Panel, then drag and drop them into objects. Automatically create percentages of any color with the Tint Panel. Maintain your work in an unlimited number of nameable, reorderable layers—each one separately hideable and lockable.

Wonderfully flexible PostScript support, meticulously accurate alignment control, superb text editing and typographic control, varied import and export capabilities, comprehensive built-in production tools (including color separations, spot-to-process conversions, and on-screen previews)—all this is just the beginning of the list of innovative and productive features in Virtuoso, each designed to simplify your work and stimulate your creativity.

**Altsys Corporation**

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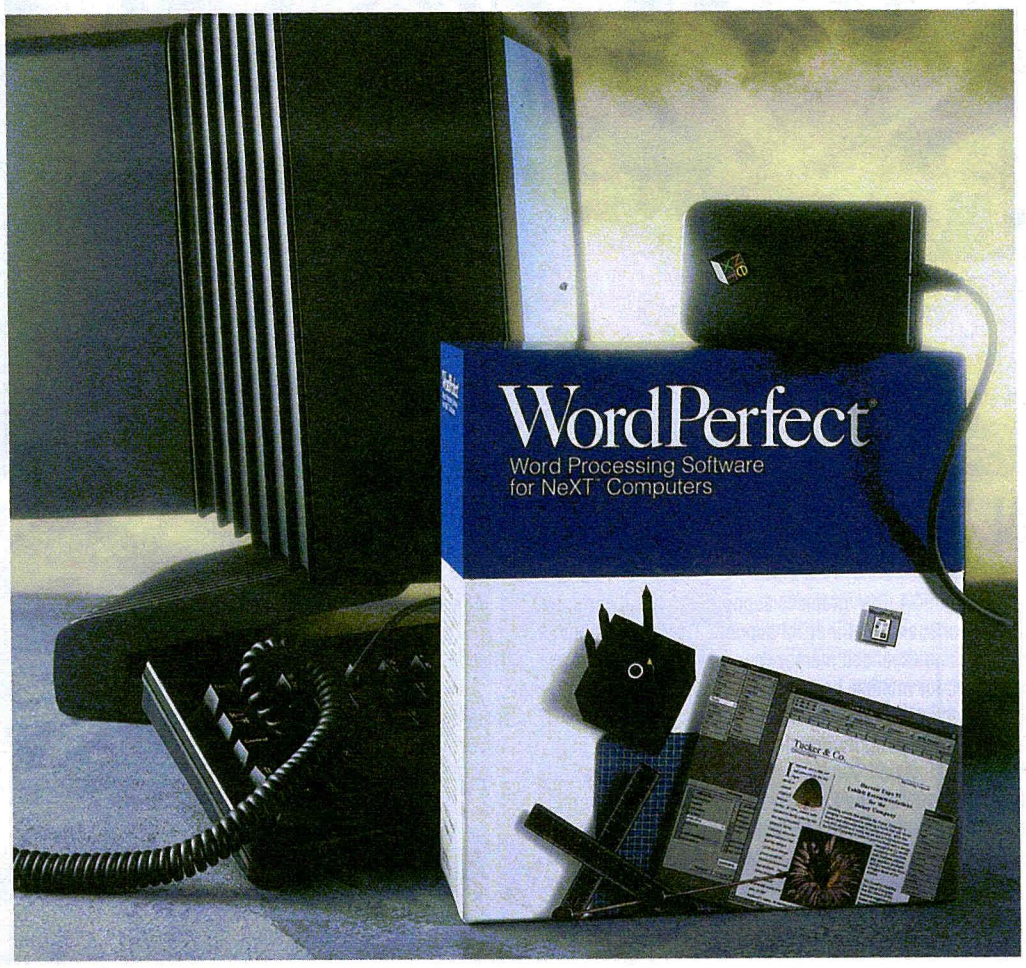
| 6931 | Virtuoso 1.0 | $495. |
| 8683 | Virtuoso 1.0 *(5 pack)* | 1895. |




## WORDPERFECT

**WordPerfect unleashed! Full-time WYSIWYG and effortless multitasking.** There are a whole lot of DOS users of **WordPerfect** out there who are struggling with whether they should start using their favorite application under Windows or on the Mac. Well, the answer is neither. If you want to realize WordPerfect's full word-processing potential, the solution is NeXT.

NeXT's unified PostScript imaging system puts the WordPerfect Preview mode to rest once and for all. Every element, including fonts of all sizes, headers, footer, footnotes, graphics, and columns, always appear just as they will print. And NeXT features like built-in multitasking and fax capability make WordPerfect the ultimate power tool for working with words.

But, of course, not *just* words. WordPerfect easily integrates text and graphics. Just grab your image file with the mouse and drop it on the page wherever you want (inserted in a line of text, tied to a paragraph, or even placed in a header or footer). You can scale, move, and rotate your images every which way, and add captions and borders with ease. Each time the type will automatically rearrange itself.

Naturally, you get all the basic word-processing power features WordPerfect is famous for: parallel and newspaper columns, powerful macros, mail merge, table of contents, indexing, footnotes/endnotes, a 115,000-word spell checker, thesaurus, and automatic timed backup. Any questions? Ask the Digital Librarian or consult the online reference manual. This is truly full-featured word processing for NeXT.

**WordPerfect**

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| 8818 | WordPerfect 1.0.1 | $299. |
| 1576 | WordPerfect Additional Station | 169. |

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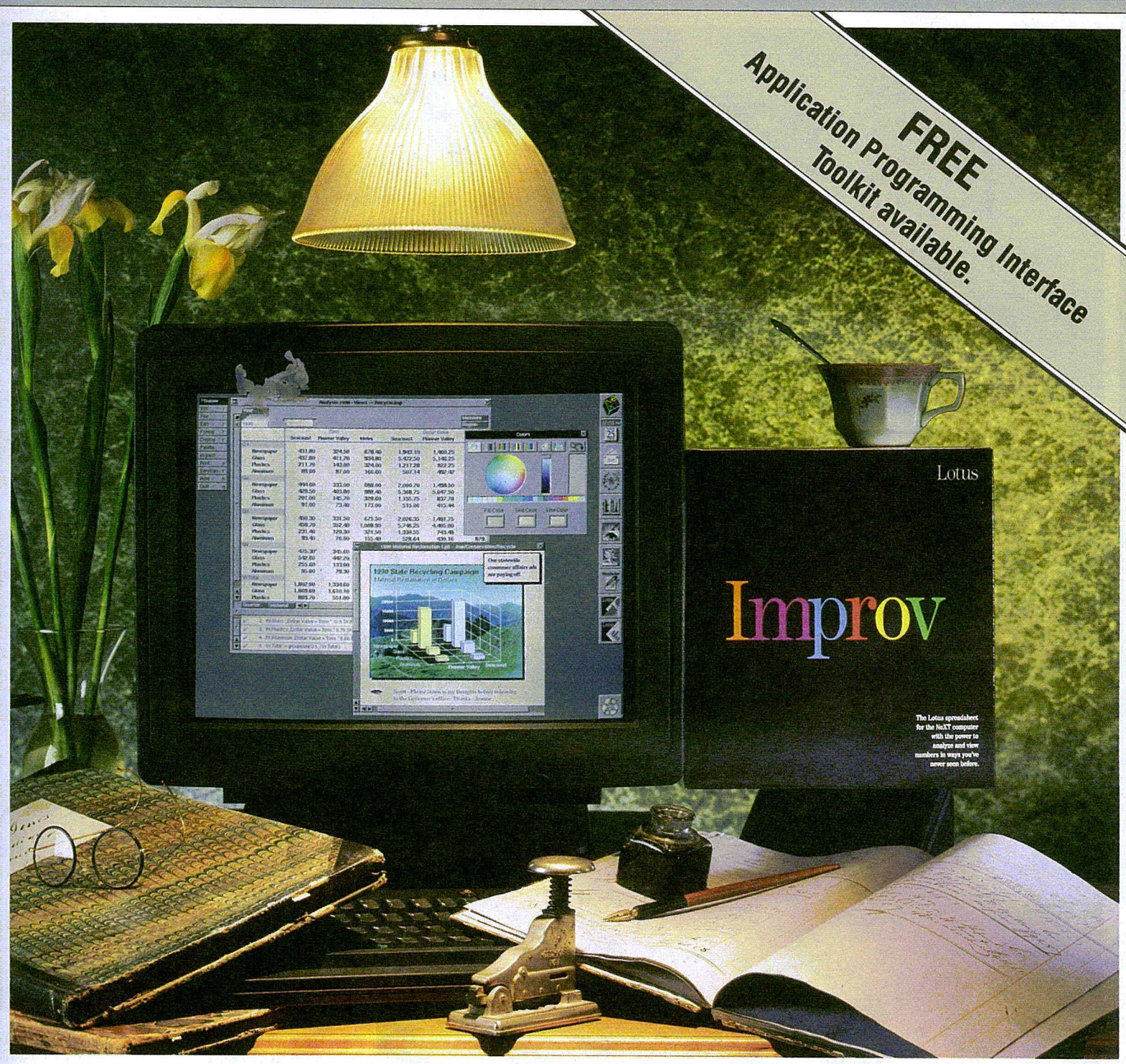


# LOTUS REINVENTS THE SPREADSHEET.

## IMPROV

**Look at your data in a whole new light.** What happens when you give the creators of the world's best-selling spreadsheet an 040 processor and 8 MB of RAM and let them improvise to their heart's content? You get Lotus Improv, a revolutionary spreadsheet for analyzing, viewing, and presenting your data in ways never before possible.

Improv's unique dynamic view feature lets you see the same data in multiple ways to explore data relationships and prepare targeted reports. Just use the mouse to rearrange your spreadsheet and get a whole new view instantly, without any re-keying. You can actually work with 12 different catagories of data at once, displayed in 2D or 3D format.

Improv lets you use plain English to define cells and create formulas (e.g., "Dollars = Tons x 12.5"). So your spreadsheets document themselves and are easy to modify and re-use. For complex formulas, you can call on a host of built-in *Lotus 1-2-3* style functions. All of which makes it easy to build spreadsheets from scratch. You can also use the extensive collection of prepackaged templates and/or import existing *1-2-3* files directly.

Improv lets you combine graphs, texts, images, and even sound with stunning clarity and resolution that take full advantage of NeXT. But how good is it , really? *Byte* (10/90) wrote, "Improv knocked me out." *PC World* (11/90) called it "a stunningly simple approach to organizing complex data."

*What Micro? Magazine* (UK, 4/91) awarded it "Most Innovative Product 1990." And *InfoWorld* (10/91) wrote, "Improv is an exciting alternative to traditional spreadsheet programs...it's one of the most innovative programs we've seen in some time."

**Lotus Development**
9794 Improv 1.0 ..... **$499.**

**Call 800-800-NeXT to order.**

## ELECTROFILE

**Electronic filing arrives.** Introducing a real solution for document management that gives you the power to locate any type of file—text, TIFF, EPS, etc.—quickly and easily. No matter how many files your library contains.

**ElectroFile** from Insight Software allows you to build your own classification scheme, based upon your own requirements. Because documents can be indexed and classified in numerous ways, they become much easier to locate—even those without text. ElectroFile's retrieval engine is based upon B*Tree indexes which generate fast searches, regardless of the number of documents in the library. You can design complex search paradigms with just a few keystrokes, thereby reducing thousands of possibilities down to the right one. Once you find the file you're looking for, just click "show" and ElectroFile will display an image of the original document alongside the classification interface. Then you can make corrections, attach other files, add notes or important text, and even record voice messages on the document.

And now ElectroFile is compatible with a variety of high-speed scanners and optical character recognition (OCR) systems. So you really can use it as a paperless filing cabinet. Just scan images and documents directly onto your hard drive via ElectroFile and forget about hard copies altogether!

Designed to be both powerful and flexible, ElectroFile is ideal for imaging, cataloging, customer support, account processing, or any activity which can take advantage of cross-indexing. After all, if you own a NeXT computer you're already halfway to having the world's most sophisticated filing system right there on your desk—now, with ElectroFile, you can go all the way.

**Insight Software ... 30 day MBG**
3308 ElectroFile 2.0 ..... **$449.**

## WINGZ

**It takes spreadsheet power to new heights. Wingz** is *the* easy-to-use, high-performance graphic spreadsheet for business and technical professionals. You can combine numbers, words, charts, and graphics in one window and print to one page—all with one product. The Wingz worksheet is 32,768 rows by 32,768 columns (more than a billion cells) and includes over 140 built-in functions, 2D and 3D charts, and support for as many colors as your system can display.

Wingz includes HyperScript, an English-like event-driven development environment, and DataLink, an SQL database access tool. HyperScript was written specifically for graphical application development and allows you to place functional buttons, scrolling lists, and other controls right on the worksheet. And with its built-in LEARN mode, even novice users can create their own applications or customize the Wingz environment quickly and easily. DataLink, which was written in HyperScript, gives you point-and-click access to data in Informix SQL databases without having to know SQL. Just point and click at the data you need—you never have to leave Wingz' friendly graphical environment. DataLink also includes a function library so you can build custom front-end applications for your SQL database and Executive Information Systems (EIS).

Other features include powerful text capabilities—including fields for free-floating text on the worksheet, with multiple text-processing options and attribute settings—and the ability to import/export Wingz graphics as EPS images.

Minimize your reliance on MIS and create your own applications and reports with Wingz!

**Informix Software**
3332 Wingz 1.1AB ..... **$469.**

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## FRAMEMAKER

**The ideal document publisher for corporate workgroups.** Imagine WYSIWYG word processing, page layout, graphics, tables, and even equations in one program. That's **FrameMaker**—all the writing and graphic tools you need for long, structured documents like textbooks, software documentation, policy manuals, and proposals. And it was specifically designed to be used by multiple authors working together across multiple platforms. In fact it offers 100% compatibility between 25 different UNIX platforms and the Macintosh (and even won a 1991 *MacUser* Eddy Award).

The sophisticated page-layout features include the ability to create up to 25 master pages (i.e., page formats) per document. So you can ensure consistency as new files are incorporated and documents are revised, edited, and rearranged. You can also create extensive tables of contents, lists of tables, indexes, and cross references that will automatically update whenever your document changes.

FrameMaker's flexible drawing tools include a broad palette of pen and fill patterns for drawing detailed forms, diagrams, or complex schematics.

The word processing capabilities rival those of dedicated word processors. There's a 130,000-word spelling and hyphenation dictionary; search and replace; automatic page, paragraph, and footnote numbering; and a complete equation palette with over 250 symbols, delimiters, and operators.

You can also create complex multi-page tables—complete with graphics and equations that include multiple styles in a single cell. And there's an ingenious conditional text feature that lets you develop multiple variations of a document from a single source file by simply tagging the variable text or graphics.

As *NeXTWORLD* (Fall '91) wrote: "If your work calls for long documents with large page counts, multiple chapters, tables, lists, illustrations, and indexes, then you won't believe your luck...FrameMaker is as good as they come."

**Frame Technology**
8241 FrameMaker 3.0..... **$549.**

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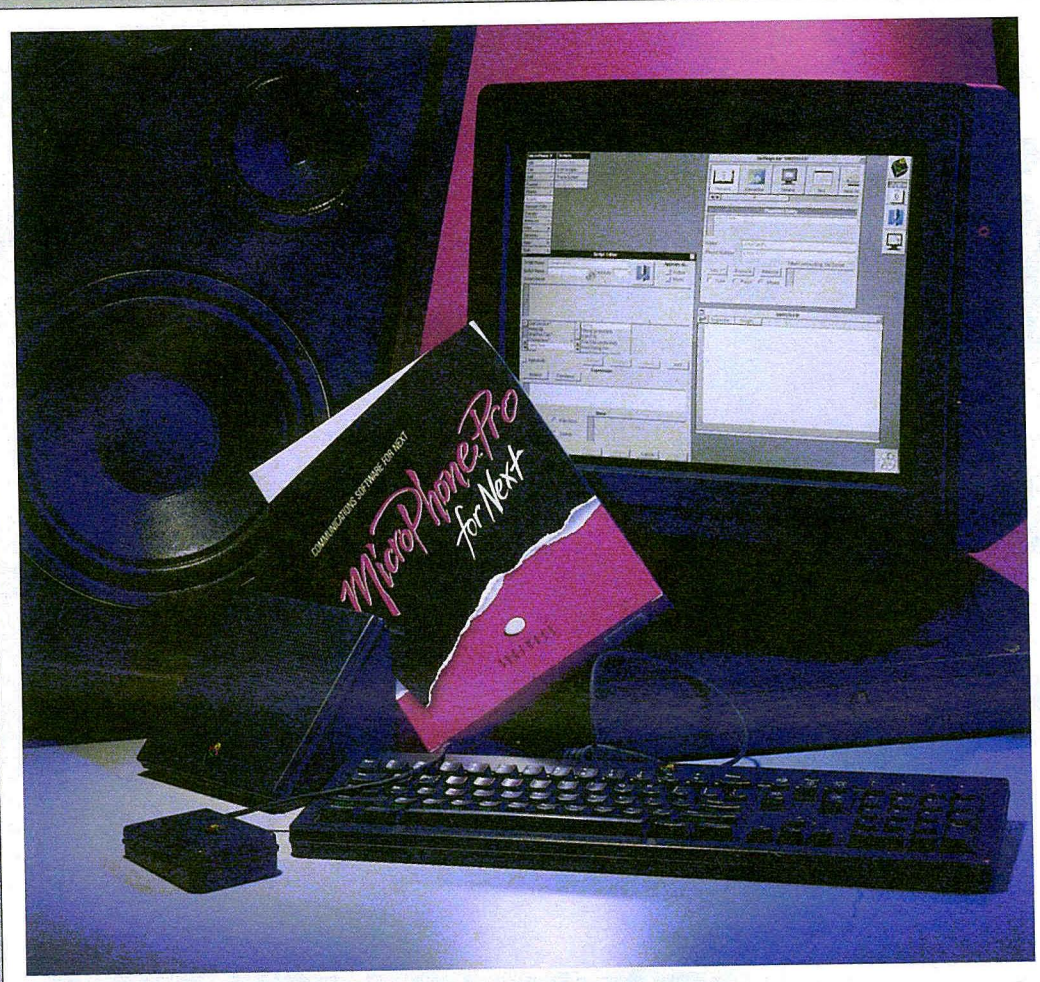



## MicroPhone Pro

**Great communications software has arrived.** With **MicroPhone Pro**, you'll have easy, intuitive communications software that takes full advantage of NeXT capabilities.

Watch in amazement or, better yet, do something else entirely, while MicroPhone Pro dials your mail service and automatically downloads your messages in the background.

Next time you log onto your favorite service, turn on the *Watch Me* feature and your keystrokes will be saved. Give the resulting script a button and you're never more than a click away. If you've written MicroPhone scripts in Windows or on the Mac, you'll discover you can use them on the NeXT with little or no modification.

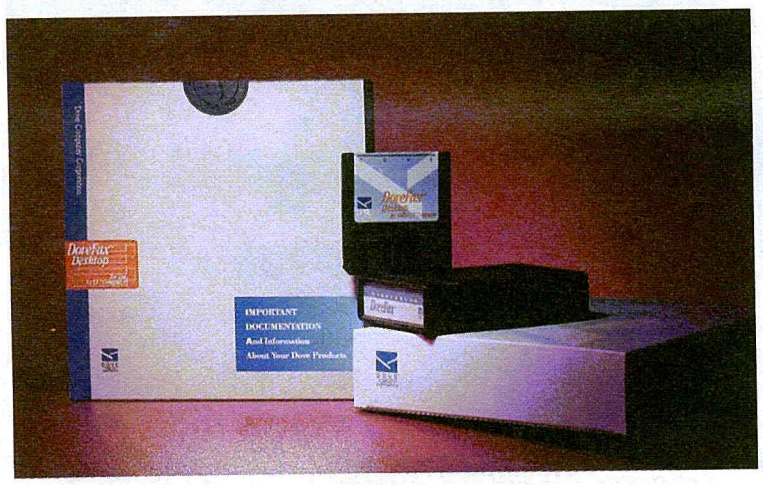
And wait until you see Loran, a new MicroPhone Pro document that includes front ends to CompuServe Mail and Software Ventures' own BBS. Even though you send and receive mail from entirely different systems, the Loran interface you use is the same, saving you time and effort. Eventually, Loran will hold additional front ends for news, messaging and other services, making it a true information valet. You can also build your own NeXT front end with MicroPhone Pro's enhanced scripting power and NeXT's Interface Builder.

It's so easy to be online with MicroPhone Pro that you'll soon be doubling your pleasure and your productivity—thanks to multi-session capability that allows you to log onto several information services simultaneously. Safely send or receive anything—text, pictures, or sound—through a comprehensive set of file transfer protocols such as ASCII, XMODEM, YMODEM, ZMODEM, and KERMIT.

Insanely great software for an insanely great computer.

**Software Ventures ... 30 day MBG**

4759 MicroPhone Pro 1.0 ..... **$279.**




## DoveFax Pro

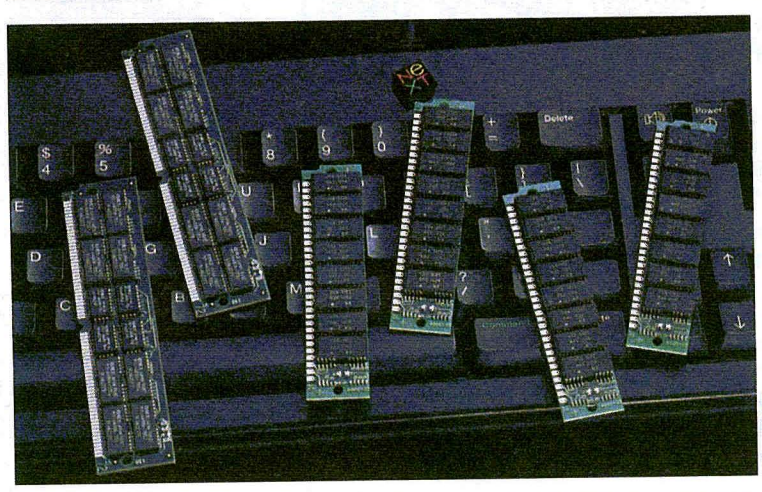
**A fax and modem combined.** The **DoveFax Desktop for NeXT** features a 9600 bps CCITT Group-3-compatible fax that makes full use of the intuitive NeXT fax interface so you can send any kind of document directly from your NeXT. DoveFax features true background operation, an on line telephone directory, automatic answering, fax preview, and customized cover pages. You can send faxes at high resolution and print incoming faxes at your choice of 200 x 200 dpi or 200 x 100 dpi Display PostScript.

DoveFax Desktop also includes a Hayes-compatible 2400 bps modem that supports a complete range of communications services, protocols, applications, and electronic bulletin boards. The **DoveFax 14.4 Pro** handles everything the DoveFax can, but has a 14,400 bps data modem with V.32, V.42/V.42bis advanced data compression and error correction for throughput up to 57,600 bps. You can also send faxes at 14,400 bps (downward compatible to 9600 bps). Both modems are backed by Dove's solid customer support and 1-year warranty.

**Dove Computer ... 1 year warranty**

9356 DoveFax Desktop ..... **$295.**

7154 DoveFax 14.4 Pro ..... **$499.**



## Memory

**Running out of RAM?** We can help you get back to full power overnight. Just call as soon as you start running out of room and we'll send more memory by Airborne Express for delivery the next business day. Our **4 MB** and **16 MB Memory Upgrade Kits** feature low profile, non-parity, 80ns SIMMs that are compatible with the 68030 and 68040 Cube and the 040 workstation (monochrome only). We also carry **8 MB Memory Upgrade Kits** for NeXTstation Color and NeXTdimension boards. (The latter requires 2 Kits/16 MB at a time.) And Installation? For the workstation we recommend an authorized dealer—otherwise you risk voiding the warranty. But you can go ahead and install them yourself in the cube—we'll provide toll-free tech support.

**Memory ... 2 year warranty**

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9755 Toshiba 3.5" ED Floppy

**What can you label next?** Ma Use your dot matrix, inkjet, or diskettes, tabs, name badges,

| ITEM NO. | AVERY NO. | DESCRIPT |
|---|---|---|
| 1430 | 5161 | 1" x 4" Addres |
| 7050 | 5660 | 1" x 2⅝" Clear |
| 4807 | 5160 | 1" x 2⅝" White |
| 4808 | 5162 | 1⅓" x 4" Laser |
| 4810 | 5165 | 8½" x 11" Full |
| 4811 | 5182 | 8½" x 11" Lase |
| 5392 | 5196 | 3.5" Disk Label |

SIMSON00001543

SIMSON0000154

# NeXTConnection™

## HAYES ISDN

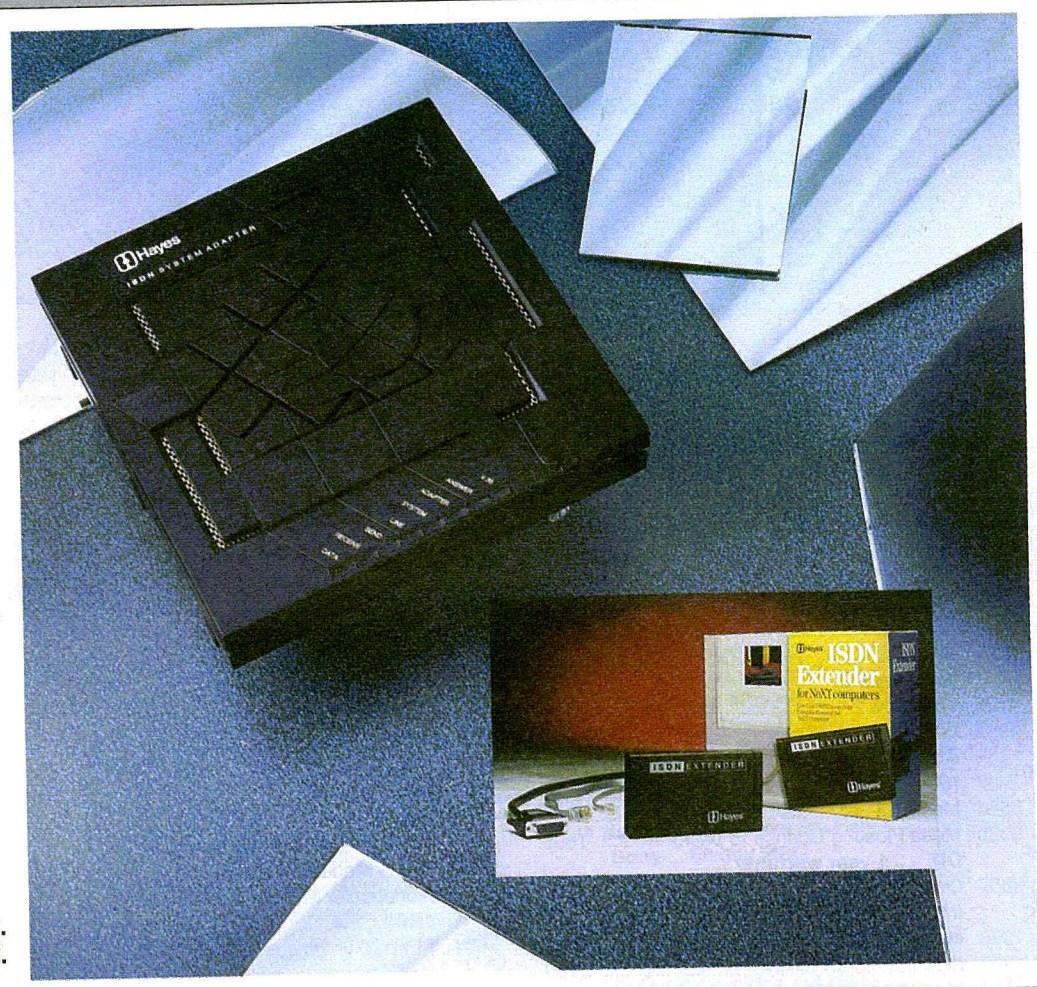
**grated voice and data technology has arrived.** And NeXT puters are the perfect platform for this exciting breakthrough. he new **Hayes ISDN Extender** is designed to work with TSTEP 3.0 and all the new ISDN applications that are coming for high-speed, digitized voice, data, fax modem, and multi-ia as well as remote LAN connections. It's the first telecom-ications network interface module for NeXT computers that ides both ISDN Basic Rate Access and analog telephone line nectivity to NeXT computers, thereby providing low-cost, erful connectivity to NeXT users worldwide. There's an 8-pin ular connector for an ISDN Basic Rate Line and a 6-pin connector for an analog phone line.

he Extender supports both AT&T and Northern Telecom ISDN ches and fully implements both the Hayes Standard AT mand Set (so you can use those familiar Hayes commands) the Hayes AutoStream protocol which, with supported ware, opens the door to multiple voice/data sessions. ata transmission options range from 300 bps to 38,400 and voice capabilities include the standard analog phone face along with battery feed and ring voltage for up to three al analog devices (e.g., phone, fax, and answering machine).

u're not using NeXTSTEP 3.0 or you need to bring ISDN nectivity to a Sun or other workstation you'll want the **s ISDN System Adapter**, an external RS-232 serial device i a switch-selectable V.35 interface) that comes complete its own Digital Signal Processor (DSP), codec, high-speed essor, and power supply.

**s ... 2 year warranty**

3 ISDN Extender ..... **$279.**
3 ISDN System Adapter *(requires cable)* ..... **749.**

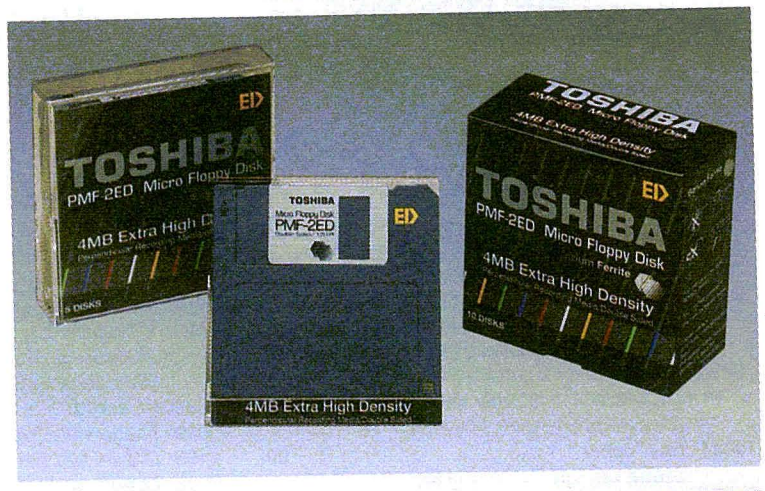



## TOSHIBA DISKS

**iba announces dramatic price reduction on Toshiba 2.88 MB ED disks.** Now Toshiba MB ED disks, NeXT's choice in ED disks, are also the best *value* in diskette storage for T systems. Toshiba's new pricing makes the cost per megabyte of Toshiba ED disks equal less than conventional 1.44 MB HD disks. Because Toshiba invented ED technology and is only media manufacturer with the experience and the expertise required to make superior ity 2.88 MB disks, NeXT chose Toshiba's 2.88 MB floppy disks to include with each NeXT em. Now more than ever Toshiba's 2.88 MB disks are your best choice as well.

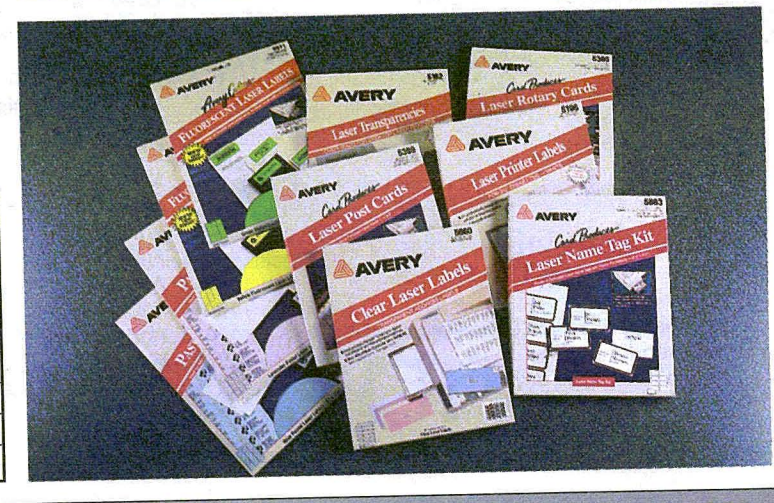
**iba ... lifetime warranty**

3 Toshiba 3.5" ED Floppy Disk *(5 Pack)*..... **$17.**
5 Toshiba 3.5" ED Floppy Disks *(10 Pack)* ..... **29.**




## AVERY

**t can you label next?** Make sure everything is easily identifyable with **Avery Laser Labels**. your dot matrix, inkjet, or laser printer to label your folders, envelopes, post cards, ettes, tabs, name badges, rotary cards, audio and videotapes, and index cards.




| ITEM NO. | AVERY NO. | DESCRIPTION | PRICE |
|---|---|---|---|
| 30 | 5161 | 1" x 4" Address Labels | 24. |
| 50 | 5660 | 1" x 2⅝" Clear Address | 32. |
| 07 | 5160 | 1" x 2⅝" White Address | 24. |
| 08 | 5162 | 1⅓" x 4" Laser Labels | 24. |
| 10 | 5165 | 8½" x 11" Full Sheet Laser | 24. |
| 11 | 5182 | 8½" x 11" Laser Trans. | 22. |
| 32 | 5196 | 3.5" Disk Labels | 29. |
| 3643 | 5385 | 2⅛" x 4" Laser Rotary Cards | 18. |
| 3653 | 5389 | 4" x 6" Laser Post Cards | 15. |
| 1428 | 5266 | ⅔" x 3 7/16" File Folder | 14. |
| 4323 | 5395 | 2⅓" x 3⅜" Name Badge | 31. |
| 1618 | 5971 | 1" x 2⅝" Fluorescent Green | 12. |
| 1630 | 5972 | 1" x 2⅝" Fluorescent Yellow | 12. |
| 8771 | 5199 | Video Tape Labels | 31. |

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## Corporate Accounts Welcome

Yes, we gladly accept P.O.s. Always have, always will. In fact, we do everything possible to make corporate mail-order purchasing of computer software and peripherals as easy and enjoyable a process as possible—within the realm of common decency, of course. Many companies (including most of the Fortune 1000 and other just-as-fortunate smaller ones) have accounts with us. If you'd like to open one (or check whether your company already has one), simply call our order line at 800-800-NeXT.

## PRODUCT INDEX

### GENERAL BUSINESS & PRODUCTIVITY

**Adamation ... 30 day MBG**
3357 Who's Calling? 2.5 ... $295.
3335 Who's Calling? 2.5 *(4 pack)* ... 1349.
6817 What's Happening? 2.5 ... 219.
3334 LiveWire 1.0 *(4 pack)* ... 599.
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4997 WriteNow 2.1 *(5 pack)* ... 739.
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3876 Culture Shock 1.0 *(color)* ... 25.
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### VIDEO & SOUND

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9682 Digital Ears ... 499.
9683 Digital Ears *(with SoundWorks)* ... 669.
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**Agog, Inc. ... 30 day MBG**
1476 Squash! 1.0 79.1478 *(10 pak)* ... 699.
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**Skylee Press**
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**Teledia**
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2513 Backup Master ... 249.
7144 Backup Master *(floppy only)* ... 79.
**T/Maker**
1185 ClickArt ... 195.

### PROGRAMMING & MATH TOOLS

**Absoft**
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6745 FX Debugger ... 595.

**Call 800-800-NeXT to order.**

**Digital Toolwor**
10828 Equation Builder
**Objective Techr**
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9346 [OT Palettes: 2.0
9345 [OT Palettes: 2.0
9344 [OT Palettes: 2.0
3282 OT Provide 1.0...
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**RDR, Inc.**
10792 ImageView .....
10790 Gadgets .....
10789 Selector.....
10791 SwitchView.....
**Triakis ... 30 da**
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1965 Math++ 3.0.....
1966 DAN, the Data AI
**White Pine Softv**
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**Wolfram Researc**
2516 Mathematica 2.0 .

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**American Power**
7105 Smart-UPS 600...
9365 Smart-UPS 900...
9364 Smart-UPS 1250.
7107 Back-UPS 450 ....
**CH Products ...**
6814 TrackBall .....
**Second Glance S**
5973 Scantastic *(Epson*
7156 Scantastic *(HP Sc*
8806 Scantastic *(Microt*

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**Digital Toolworks**
10828 Equation Builder ... $199.
**Objective Technologies**
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9347 [OT Palettes: 2.0] Chooser ... 199.
9346 [OT Palettes: 2.0] Math ... 795.
9345 [OT Palettes: 2.0] SmartField ... 395.
9344 [OT Palettes: 2.0] Graph ... 795.
3282 OT Provide 1.0 ... 699.
7142 SqlBuddy *(floating license)* ... 399.
**ONyX Systems ... 30 day MBG**
2340 BugByte 2.2 ... 119.
**Professional Software**
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**RDR, Inc.**
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10790 Gadgets ... 99.
10789 Selector ... 149.
10791 SwitchView ... 109.
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## INPUT/OUTPUT

**American Power ... 2 year warranty**
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9365 Smart-UPS 900 ... 649.
9364 Smart-UPS 1250 ... 869.
7107 Back-UPS 450 ... 215.
**CH Products ... 30 day MBG**
6814 TrackBall ... 119.
**Second Glance Software**
5973 Scantastic *(Epson ES300C)* ... 299.
7156 Scantastic *(HP ScanJet IIc)* ... 299.
8806 Scantastic *(Microtek 600zs)* ... 299.
**Tripp Lite ... 2 year warranty**
1528 600VA On-Line UPS ... $559.

## DRIVES & CABLES

*All drives require a SCSI cable.*

**Cables ... lifetime warranty**
8906 SCSI 2-50 pin Centronics *(4 ft.)* ... 35.
8909 50 pin-50 pin Centronics ... 15.
10285 50 pin-50 pin Centronics *(gray, 3 feet)* ... 25.
4964 50 pin-50 pin Centronics *(gray, 6 feet)* ... 29.
6744 SCSI Terminator *(block type)* ... 15.
8991 68040 Modem Cable *(8 ft.)* ... 15.
1540 Mini DIN 8 to Mini DIN 8 Null Modem Cable 15.
1441 Mini DIN 8 to DB25 Null Modem Cable ... 15.
3466 BNC Connector *(50 ohm)* ... 3.99
3458 BNC T-Connector ... 8.99
3465 BNC Terminator without Ground ... 5.99
5722 BNC Terminator with Ground ... 6.
3456 25' Ethernet Cable *(w/BNC Connectors)* .. 25.
3432 50' Ethernet Cable *(w/BNC Connectors)* ... 39.
3437 100' Ethernet Cable *(w/BNC Connectors)* . 59.
**IOMEGA ... 1 year warranty**
2530 Bernoulli 90 MB Cartridge ... 149.
2467 Bernoulli 90 MB Cartridge Tri-Pack ... 439.
6499 Bernoulli Transportable 90 PRO ... 659.
7151 NeXT Interface Kit 65. 2481 Care Kit... 35.
**MDS Drives ... 2 year warranty**
6804 MDS 88 Removable Drive ... 579.
3603 MDS 88 Removable Cartridge ... 100.
**Micropolis ... 5 year warranty**
8984 280 MB MICRODISK *(formatted)* ... 1589.
4415 550 MB MICRODISK *(formatted)* ... 1699.
4412 860 MB MICRODISK *(formatted)* ... 1999.
6808 1.1 GB MICRODISK *(formatted)* ... 2299.
8979 280 MB Internal Hard Drive *(15 ms)* ... 1149.
8978 550 MB Internal Hard Drive *(15 ms)* ... 1299.
5029 860 MB Internal Hard Drive *(15 ms)* ... 1699.
**Peripheral Land, Inc. ... 1 year warranty**
8887 CD-ROM Caddy *(single)* ... 14.
2531 CD-ROM Caddy *(10 pack)* ... 99.
8547 Super Floppy 2.88 Drive ... 449.
2529 DAT Tape Backup ... 1999.

## ACCESSORIES

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1430 1" x 4" Address Labels ... 24.
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4811 8½" x 11" Laser Transparencies ... 22.
5392 3.5" Disk Labels ... 29.
**Canon ... 90 day warranty**
9811 512 MB Optical Cartridge MO-502m ... 175.
5488 Black Cartridge *(for Color Printer)* ... 19.
5461 Cyan Cartridge *(for Color Printer)* ... 29.
5464 Magenta Cartridge *(for Color Printer)* ... 29.
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**Hewlett-Packard ... 120 day warranty**
8099 Toner Cartridge for NeXT Printer ... 93.
**Memory ... 2 year warranty**
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8790 1 MB SIMM *(80ns)* or 9284 *(set of 4)* ... call
8910 4 MB Memory SIMM *(80ns)* ... call
1935 8 MB Memory Upgrade Kit *(for NeXTdimension, NeXTstation Color & NeXTstation Turbo)* ... call
8911 16 MB Memory Upgrade Kit *(four 4 MB)* .. call
8324 16 MB Memory Upgrade Kit *(four 8 MB)* .. call
**Moustrak ... lifetime warranty**
8576 Mouspad: black *(7" x 9")* ... *ea.* 8.
8548 Mouspad: black *(9" x 11")* ... *ea.* 9.
10313 Mouspad: L/F black *(9" x 11")* ... 10
**Pacific Micro ... 1 year warranty**
8244 External Hard Drive Enclosure ... 395.
**Sony ... 60 day MBG**
1578 DG5CL 4mm Cleanining Cartridge ... 13.
1603 DG60M *(60 meter DAT Tape)* ... 15.
2520 DG90M *(90 meter DAT Tape)* ... 19.
**SyQuest ... 60 day MBG**
5912 SyQuest Cartridge *(44 MB)* ... 65.
3603 SyQuest Cart. *(88 MB)* 100. 5531 *(3 pak)* 292.
5530 *(5 pak)* ... 480. 3600 *(10 pak)* ... 950.
**Toshiba ... lifetime warranty**
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4858 3.5" ED Floppy Disk *(5 pack)* ... 17.
9755 3.5" ED Floppy Disk *(10 pack)* ... 29.

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- Corporate P.O.s are accepted subject to credit approval.
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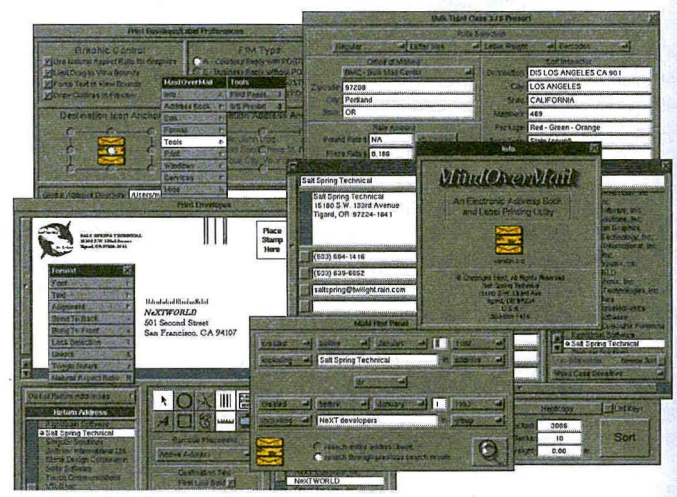
# Product Showcase

Turn here every issue for the latest-breaking, most interesting products in the NeXT™ marketplace. This is an exciting time for NeXT users. Development is exploding. The NeXTstep environment is proving to be a spawning ground for unique products. These ads keep you abreast of the best of what's out there. Showcase ads provide you with concise, easy-to-use information. Every one includes a picture, product information, and a handy reader service number.

All this in 1,075 words (picture = 1,000 words + 75 text.)

## MindOverMail™3.0, the Premier Envelope Printer

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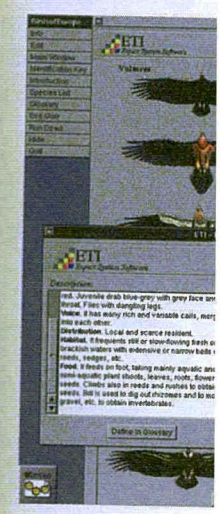
**Fax (503) 639-6652/saltspring@twilight.rain.com**

Circle 101 on reader service card

## Multime



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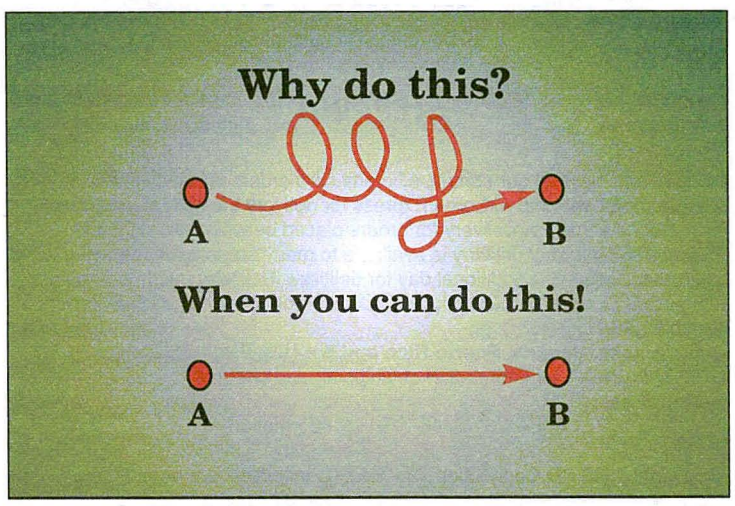


**Database Builder™** makes it happen without loop to loops. Design screens that automatically update as the database changes. Specify relationships between database tables. Build the custom applications you and your customers need. And do it right the first time.

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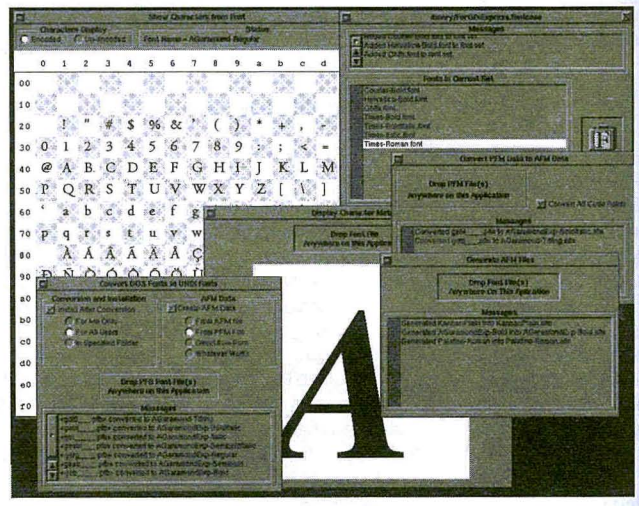
**Fax: (203) 629-0972/**

Circle 102 on reader service card

## FontWorks—Font Management Solutions




**FontWorks**—developed with Y&Y Software—is a suite of applications to manage fonts on your NeXT. **DosToNeXT** and **MacToNeXT** automatically convert and install from DOS and Macintosh storage formats; **PfmToAfm** and **AfmBuilder** create AFM data from PFM or from font; **FontCase** creates font "suitcases"; **ShowFont** and **ShowMetrics** display character sets and character metrics. TEX font management solutions also available. FontWorks applications are available at the low price of $39 each. Call for your font management solution.

**Trilithon Software/Two Ohlone/Portola Valley, California 94028/(415) 851-7233**
**info@trilithon.mpk.ca.us**

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## Shell Scri

Firstsoft Inc. presents S
that allows users to exe
scripts via drag and dro
mands, parse and brow
and drop and connect
expression using the po
available for systems
development.

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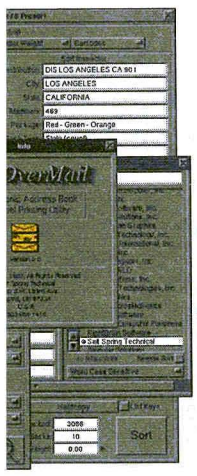
## ope Printer



OverMail 3.0 is unex-
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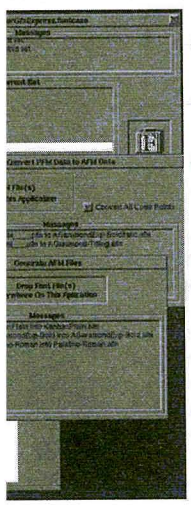
## nt Solutions



a suite of applications
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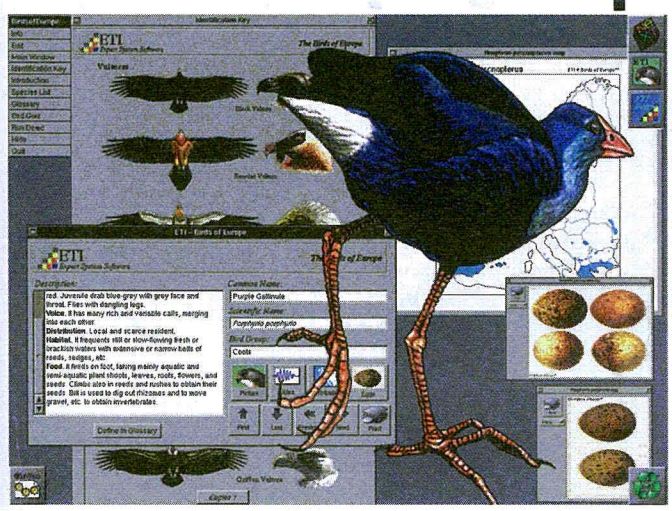
## Multimedia Birds of Europe!



Introducing the first CD from the ETI Biodiversity Database Project – the Multimedia Birds of Europe. Created in CraftMan and representing the standard by which other NeXTStep multimedia applications will be judged, the program contains descriptions of 419 birds, with sounds, distribution maps and egg paintings – over 1200 TIFF files –, a complete identification key, a glossary of hundreds of scientific terms, a useful and an interesting introduction to ornithology and a quiz to test your knowledge.
CD Version - $149, NeXT Optical Disc version - $289. FREE DEMO DISC!

**ETI/Postbox 4766/N-1009 AT Amsterdam/The Netherlands**
**Fax 31 20 525 7238/NeXTMail kestep@eti.bio.uva.nl**

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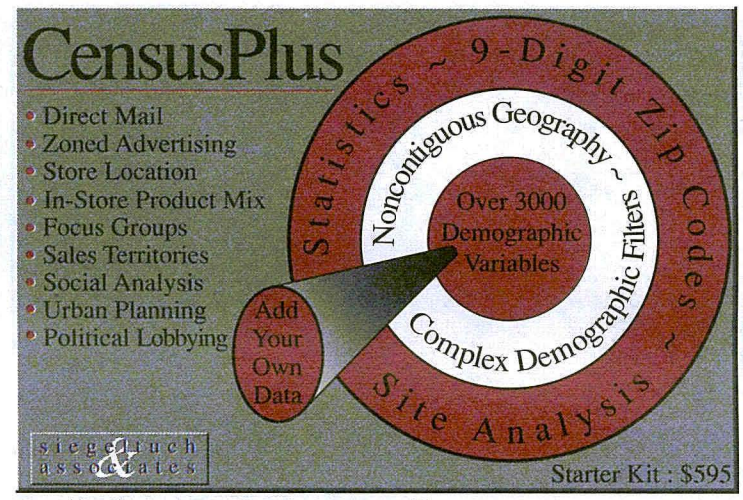
## *The* App for Marketing & Social Research




Graphically create and execute queries like:
Find places in metro Philadelphia and New Jersey where more than 20% of the households have incomes more than $100,000 and at least 10% of the workers are self-employed.
Find the geographic center of Dallas weighted by the number of homes built before 1960. Show the corresponding 9-digit zip codes.
Find the variance in the number of persons of Hispanic origin for census tracts within a 5 mile radius of downtown Chicago.
Requires Sybase server and NeXTSTEP™ 3.0

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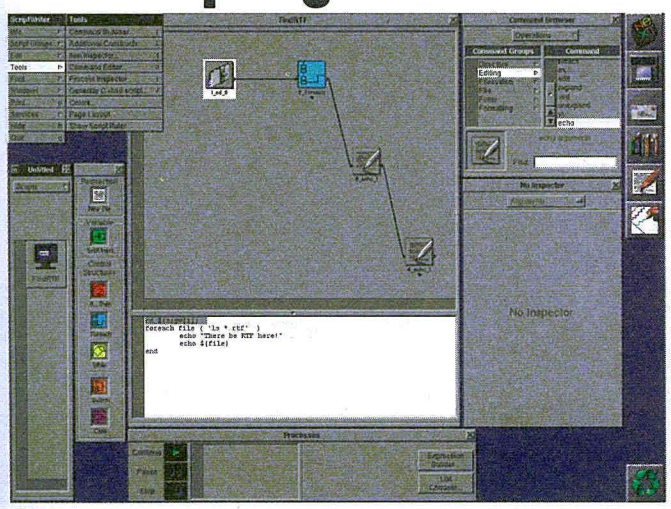
## Shell Scripting Made Easier!



Firstsoft Inc. presents ScriptWriter: an intuitive NeXTSTEP application that allows users to execute, build and manage C shell scripts. Execute scripts via drag and drop or the Services menu. Browse 370 Unix commands, parse and browse site-specific commands. Build scripts by drag and drop and connect them with pipes and redirectors. Build a Unix expression using the point and click expression builder. Firstsoft is also available for systems consulting and custom NeXTSTEP software development.

**Firstsoft Inc./P.O. Box 1252/Los Alamos, NM 87544/Voice (505) 662-7176**
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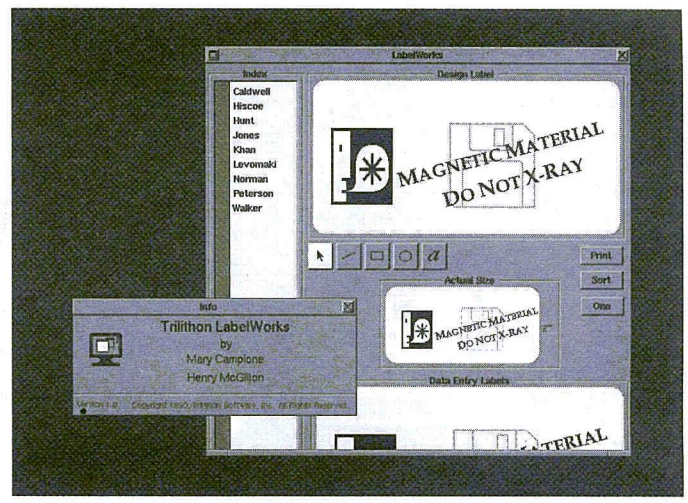
## LabelWorks—NeXT Designer Labels




**LabelWorks** is the low-cost answer to your address label and mailing list needs. The *label designer* takes advantage of NeXT's powerful text and graphics. **LabelWorks** supports the full range of Avery products including diskette labels. Import records from database managers and spreadsheets to fill dynamic text fields. Arrange labels to order by sorting on text fields. Templates get you started designing labels right away. **LabelWorks** is available at the low price of $79.

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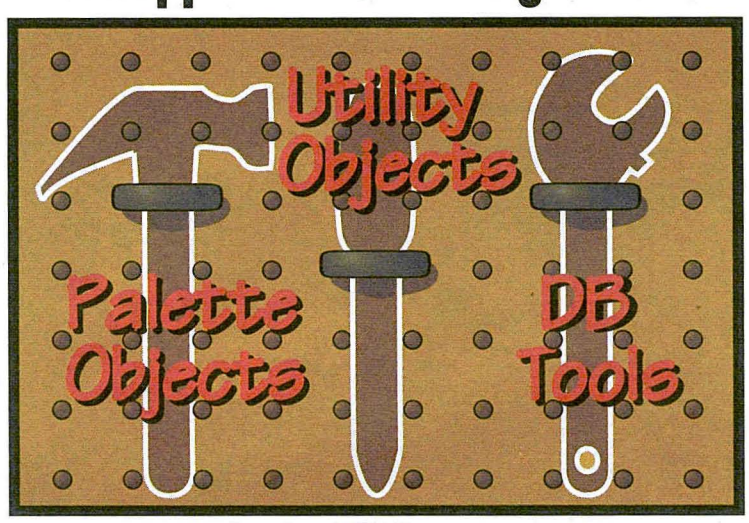
## Product Showcase

# OTI Supplies the Missing Tools...

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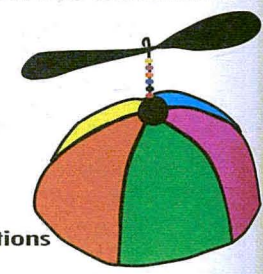

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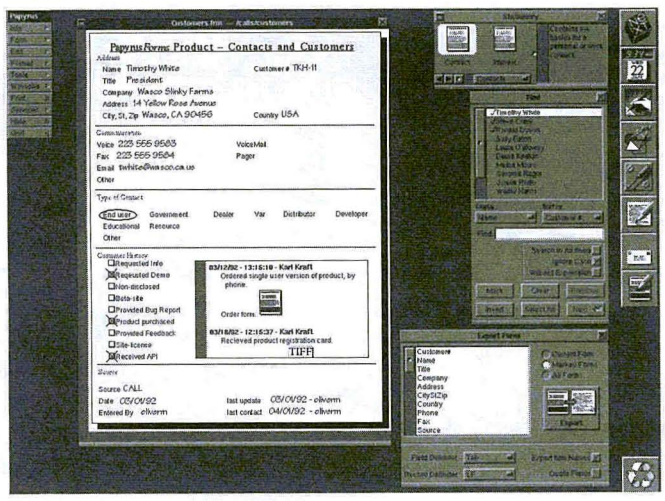
# PapyrusForms™ for NeXTSTEP




PapyrusForms is the first professional digital forms package for NextStep Computer Systems. PapyrusForms is an easy to use interpersonal application which provides a palette with 50 built-in form templates. Once a template is open, simply enter the information, attach images, voice, files, or other forms, and then save, print, or E-mail the form. The recipient of an E-mailed form doesn't even need to have PapyrusForms! Features like data-cloning and auto-naming reduce typing and increase form-productivity.

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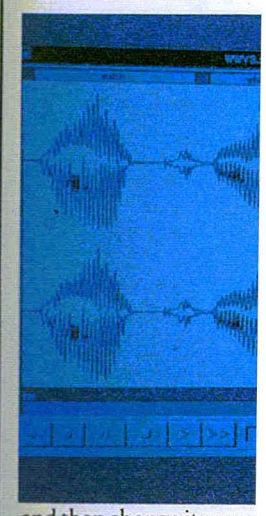
# Watch Wh



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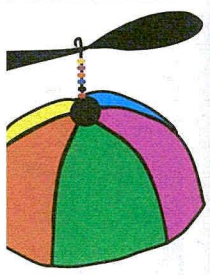

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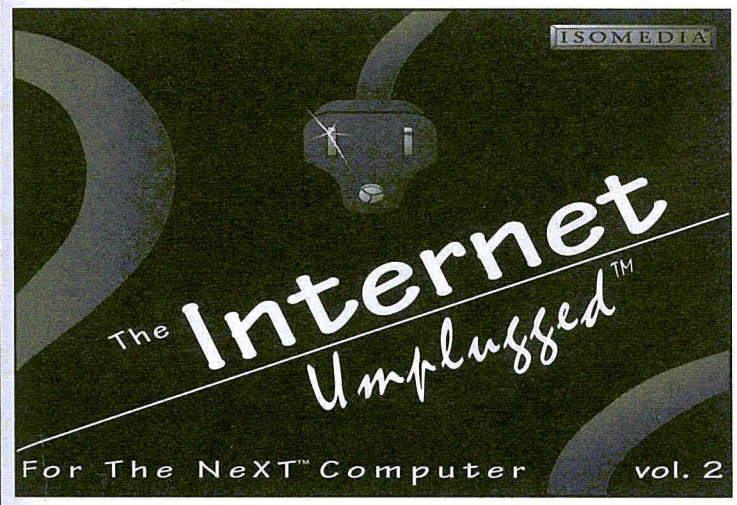
## Unplug your NeXT!




This disc contains nearly all of the freely distributable software that is available for NeXT workstations. This includes Demos, Games, Utilities, Images, CD-Quality Sounds, Programming examples, and Usenet articles through December, 1991. All software has been unpacked so it can be left on the disc, not on your hard disk. If you have a CD-ROM drive on your NeXT workstation, you need this disc. Price $79.95 VISA/MC/Discover accepted.

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## Damn!

Damn! I wouldn't equip my NeXT with your fax software if you were giving away free six-slice toasters. Just because you've got a fully comprehensive fax-modem driver you think that everyone should drop what they're doing and give you a call? Well let me tell you something: I don't want your software no matter how great it is. Who do you people think you are? It doesn't even port to the Mac!

Damn! DFax sounds like a great piece of software! My fax-modem problems have been making me pull my hair out! I'm calling your toll-free number today for more information.

Seamless integration is crucial to reliable telecommunictions, and herein lies the DFax difference. DFax 1.0 supports fully transparent fax and data transmissions on the SupraFAXmodem at speeds up to 57,600 bps. Future releases will support many additional modems. The reliability of DFax and economy of the SupraFAXmodem makes it possible for every NeXT owner to afford quality telecommunications.
DFax 1.0 — $230 retail, $145 edu
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**Alembic Systems International Ltd./14 Inverness Drive East/Building G, Suite 228/ Englewood, Colorado 80112/Tel: 1-800-452-7608/E-mail: info@alembic.com**

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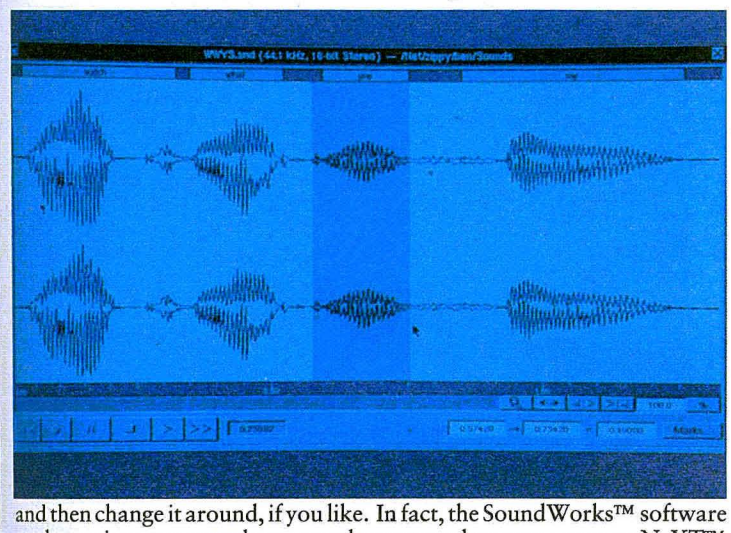
## Watch What You Say!



and then change it around, if you like. In fact, the SoundWorks™ software package gives you complete control over sounds you use on your NeXT™ computer.

Metaresearch, Inc. specializes in hardware and software tools for multimedia on the NeXT platform.

There's Digital Ears™, a precision audio digitizer (that's powerful enough to be used for laboratory data acquisition as well). And Digital Eye™, a video digitizer that comes bundled with the software applications Snapshot™ and MovieWorks™.

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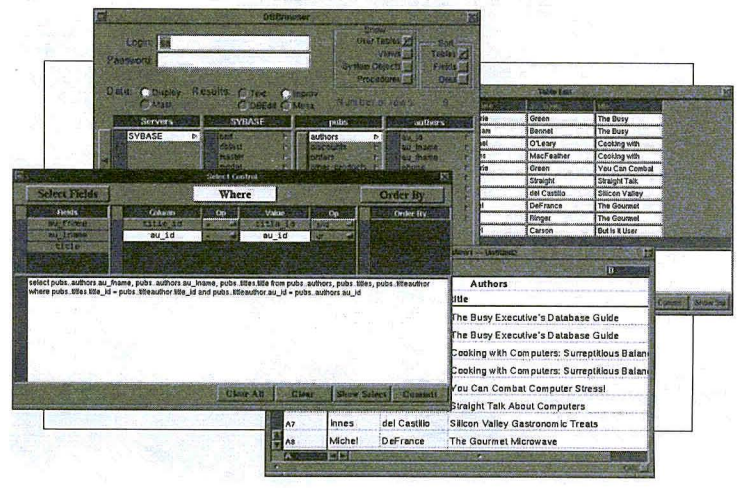
## DBInspector Makes Life with Sybase Easier!




Use DBInspector™ to read Sybase™ data with Mesa™ or Improv™. • Point and click on database columns to quickly build SQL queries • Insert, update, and delete Sybase data directly • Examine several tables, databases, or servers in an unlimited number of browsers • Inspect parameters, types, creation dates, and SQL code of database objects. Perfect for database administrators and programmers and spreadsheet users. Includes English and Japanese Uls and documentation. Price: $349.00 per user. Supports NeXTSTEP 2.1, 2.1J, and 3.0.

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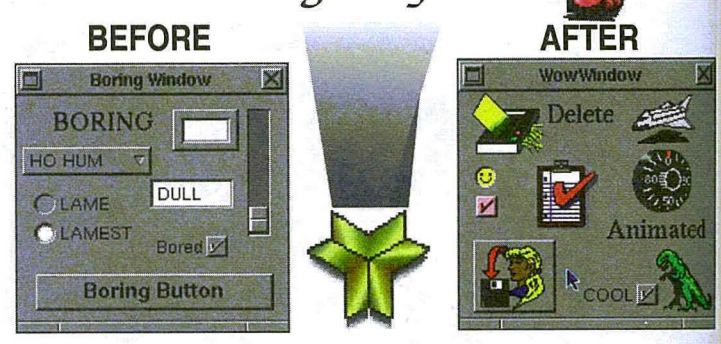


**ICONgallery** is an icon art solution and image manager. 175++ icons to customize your workspace. Make your home directory something other than the house. Embellish your custom applications with custom buttons and animated icon sequences. Give your UNIX script an icon and have it perform a NeXT® launch. Manage and view **your own** images in the gallery! **ICONgallery** is an imaginative icon solution - only $99!

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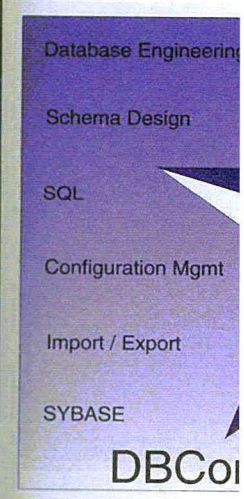
### DBCommand

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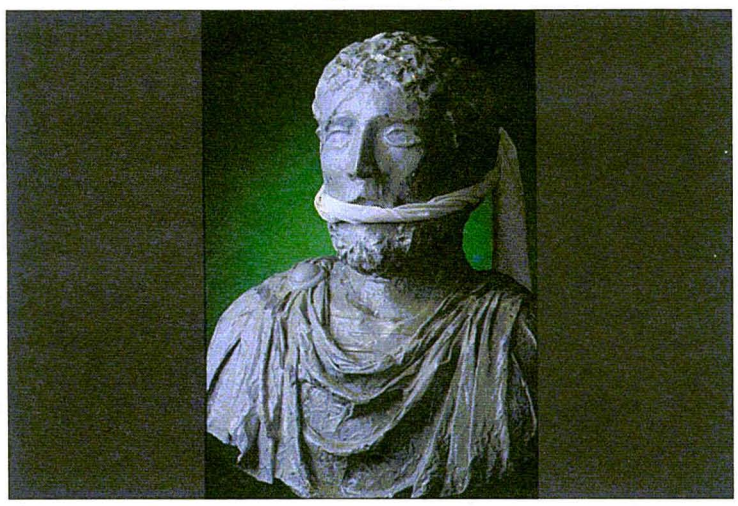
### Don't Get Caught Speechless!



Trillium Sound Research Inc. presents the TextToSpeech Kit for the NeXT computer. The TTS Kit is a full-featured system which converts any length of text into natural sounding speech in real-time. The Developer Kit ($350.00 CDN) enables developers to build and test applications incorporating text-to-speech. The User Kit ($175.00 CDN) allows users to run applications built using the Developer Kit. A services menu application is bundled. Brochures are available.

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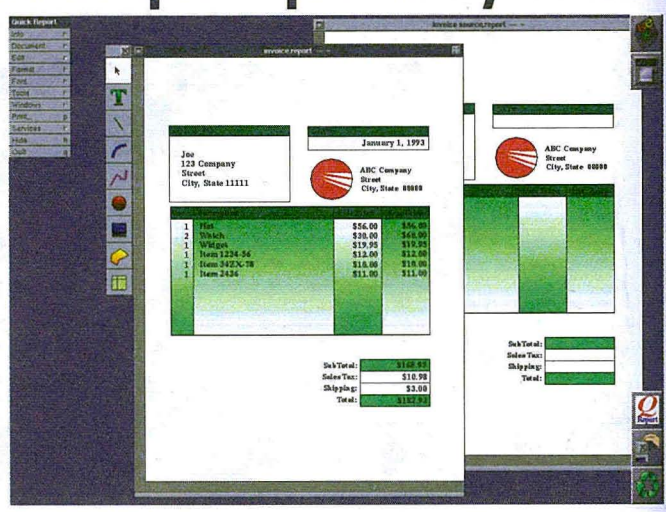
### QuickReport™ presents your data.



**QuickReport™** is the first stand alone reporting tool for the NeXT computer. With QuickReport™ you can draw the standard look of your report and specify where you want your data to go. Then watch as your information flows onto your custom report. It's that simple. Users can design a report once and use it on different sets of data. Application developers can use QuickReport™ as a complete report generator for applications.
**QuickReport™** can read data from text files or directly from the QuickBase-SQL database server. Price:$39

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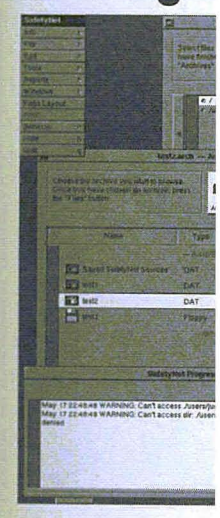
### Working



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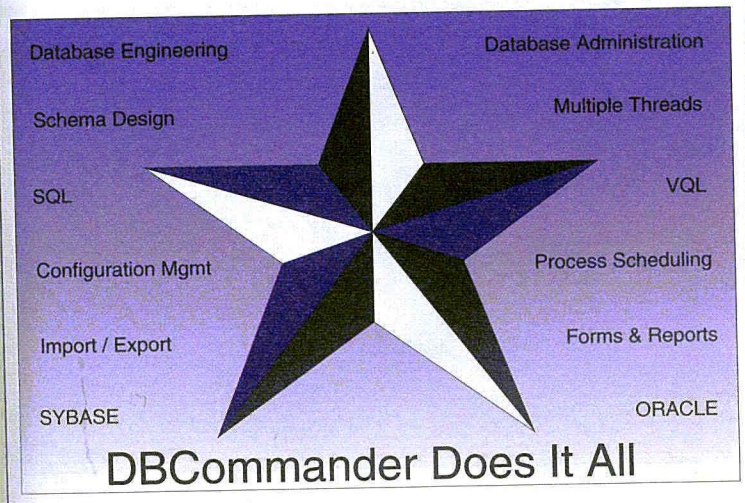


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## New CDs from Skylee!

A new edition of the definitive collection of free and shareware software for NeXTSTEP systems: over 600 megabytes of utilities, source, references, games, demos, and more. Updated for NeXTSTEP 3.0. Still just $99! Available from NeXTConnection.
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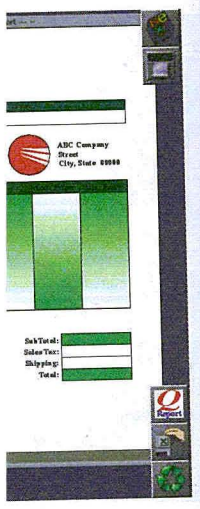


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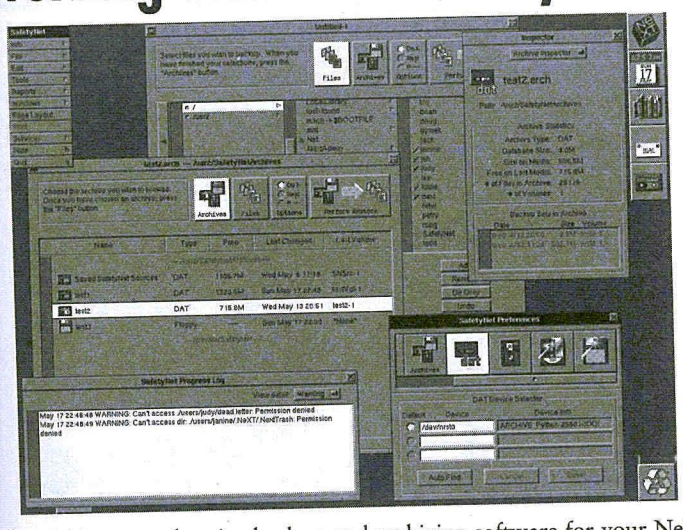


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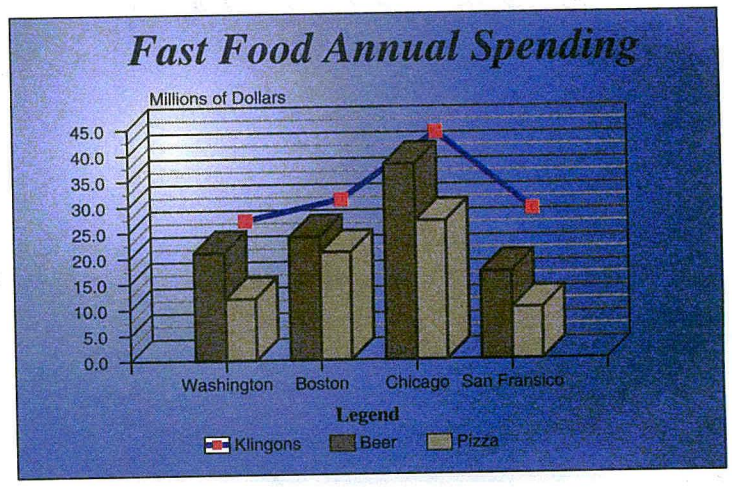


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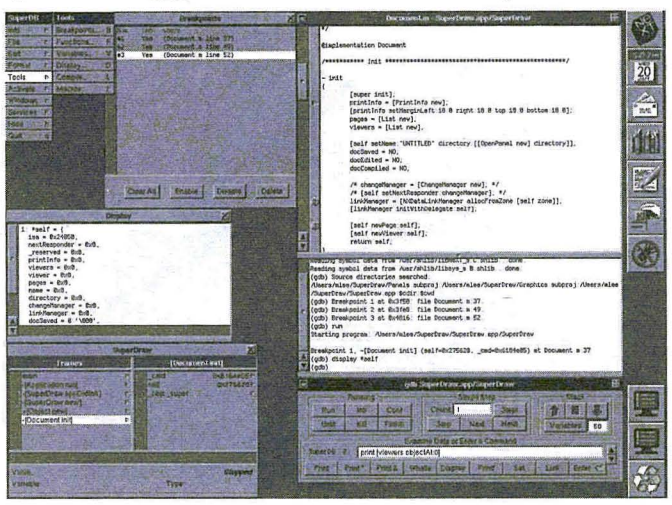

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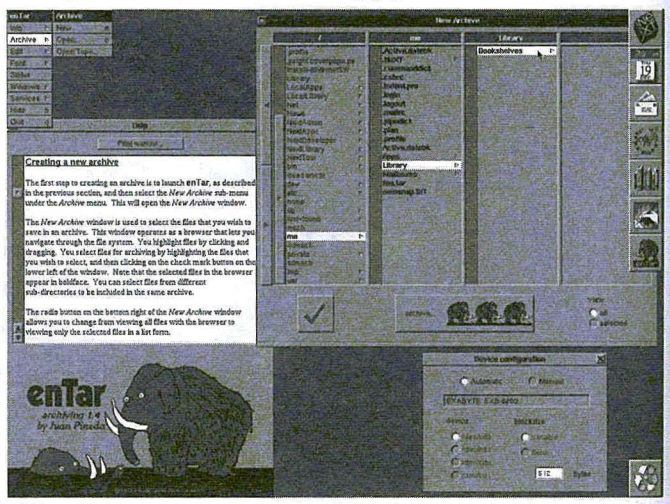

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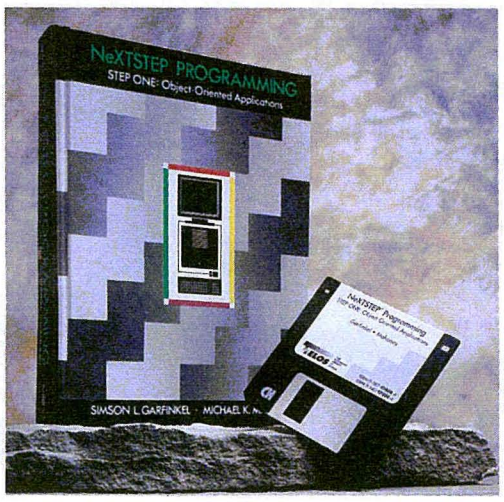


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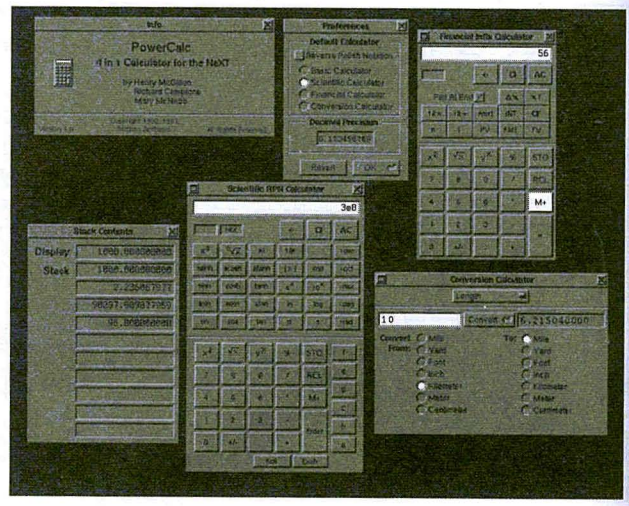


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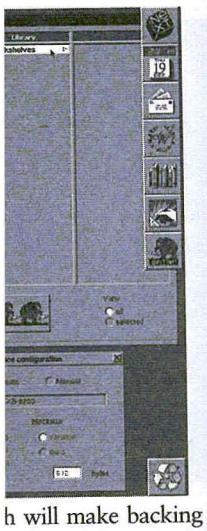

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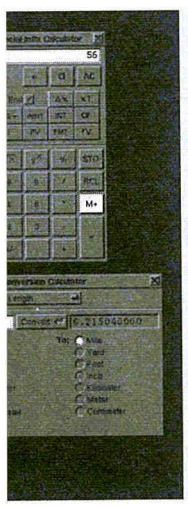

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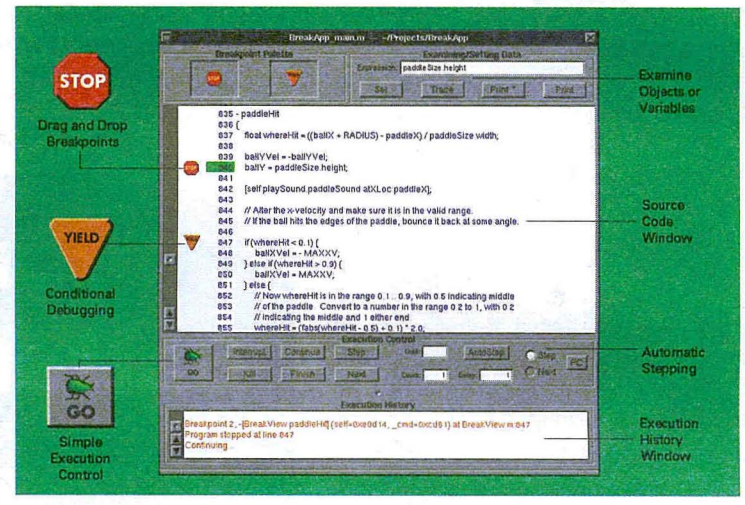


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# Bronx Up, Battery Down

JOHN PERRY BARLOW

I am not writing this column on a NeXT. In many ways, I wish I were. I miss its speed, its elegant totality as a working environment, and the hardy stoicism of its software.

Whatever its virtues, there's no way I could use a NeXT at this moment. I am (as I write this word) southbound on the 7th Avenue Express between Times Square and Soho. I am using a Macintosh PowerBook, the closest thing to the NeXT experience I could conjure in this nonstandard workplace.

Some will snort that a desire to write in the New York subway system is a mere perversity, and while it would hardly be the first time some harmless little pleasure of mine incited disapproval, I would say there's more going on here. Indeed, while it's an admittedly extreme case of it, I think that what I'm doing now may represent the future of digital work.

While the virtual world inside my NeXT may be lush, the physical environment, the place my body must go to get there, usually feels like a desert. Offices don't inspire. The Real World, on the other hand, can offer many a liberating whack upside the literary head.

Anyway, whatever the reason, owning a notebook computer and a fist phone has changed the way I approach infowork even more than my ascension from a Smith-Corona to a Compaq. Hot notebook sales demonstrate that a lot of others share this experience. Many even doubt the very future of desktop computing. If they're right, what does that say about the future of NeXT, which has no apparent plans to make so much as a luggable?

Well, I suppose NeXT might change its mind, but its product strategists seem pretty convinced that a six-pound, battery-operated NeXT is a technical challenge over which its gossamer-thin resources can't stretch. Which leaves only a few options to the NeXThead with dreams of true mobility.

First, of course, you can do nothing. You can stay chained to your desk, and cast upon the wild, free-roaming computists of your acquaintance the same baleful gaze you presently reserve for the rich, the beautiful, and Macarthur Foundation grant recipients – the same gaze DOS slaves once cast upon you and your NeXT.

Or you can pin your hopes on NeXTSTEP '486. When NeXT finally ships its Intel version, you can expect that Toshiba or Dell or Komputrz R Us will have a slick little plastic slab that will run it in some slightly cobbled-together fashion.

Or you can grit your teeth and do what I've done: get yourself a PowerBook. By this I don't mean abandoning your NeXT. It is possible, by some combination of determination, grace, and spit, to integrate the two pretty seamlessly. You don't get the best of both worlds, but you get something like the better half of both worlds.

Unfortunately, a full accounting of the process I've gone through to reach the current level of NeXT-to-PowerBook exchange transparency would sound a lot like techno-whining. After a year during which I've carried my PowerBook most all the time it wasn't broken (another long story), I conclude this: If NeXT wants a major stake in the future of computing and remains unwilling or unable to make a truly portable machine, it's going to have to work a lot harder on making its products open to interaction with other manufacturers' portables.

The future is on my lap (or, soon, in my pocket) – not on my desk. And we'll see where the future of NeXT lies.

JOHN PERRY BARLOW *appears in this space every issue.*

# Strange Chains

**NEXT GAMES**

*by* SCOTT KIM

What do the words *below*, *since*, and *after* have in common? They are all synonyms of the word *next*, according to the Digital Webster thesaurus. Here, to your right, are eight more triplets of words to puzzle over. All words in each triplet are listed in the Digital Webster thesaurus as synonyms of the same four-letter word.

Another game you can play with Digital Webster is to get from one word to another by following chains of synonyms. For instance, you can get from *black* to *white* in just six steps, as shown on the right. The turning point is the word *austere*, which has both positive and negative meanings.

Can you find synonym chains for *work/play*, *yes/no*, and *matter/energy*? Can you find a shorter synonym chain for *black/white*? Consecutive words in a synonym chain must have one word listed as a synonym of the other in Digital Webster. Words in parentheses may be omitted. Multiple-word phrases, obscene words (preceded by *), and hyphenated words are not allowed.

**1. spell, turn, age** _time_
**2. couch, promise, news** _____
**3. enjoy, akin, equal** _____
**4. precise, awfully, really** _____
**5. unique, simple, yet** _____
**6. brave, fun, prey** _____
**7. watch, face, eye** _____
**8. spring, emanate, stop** _____

| black | work | yes | matter | black |
|---|---|---|---|---|
| somber | _____ | _____ | _____ | _____ |
| bleak | play | _____ | _____ | _____ |
| austere | | no | _____ | _____ |
| sharp | | | energy | _____ |
| bright | | | | white |
| white | | | | |

## CONTEST

Find the shortest possible synonym chains for any or all of the following word pairs: *cut/paste*, *do/undo*, *next/cube*, *part/whole*, *true/false*, *circle/square*, *order/chaos*, *red/green*. Up to ten lucky winners will receive *NeXTWORLD* T-shirts. Address entries to Puzzle Editor, *NeXTWORLD*, 501 Second St., San Francisco, CA 94107. Or fax us at 415/978-3196. And while you're at it, write us a note about the magazine. Entries must be received by April 15, 1993.

**The correct answers to the Scarlet Letter puzzle in NeXTWORLD February/March were:**

| | |
|---|---|
| Upper Case | Lower Case |
| Green | Yellow |
| Blue | Scarlet |
| A | B |
| Right Side Up | Upside Down |
| Roman | Italic |

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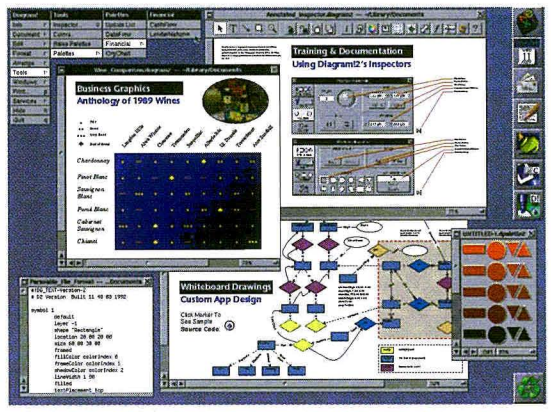


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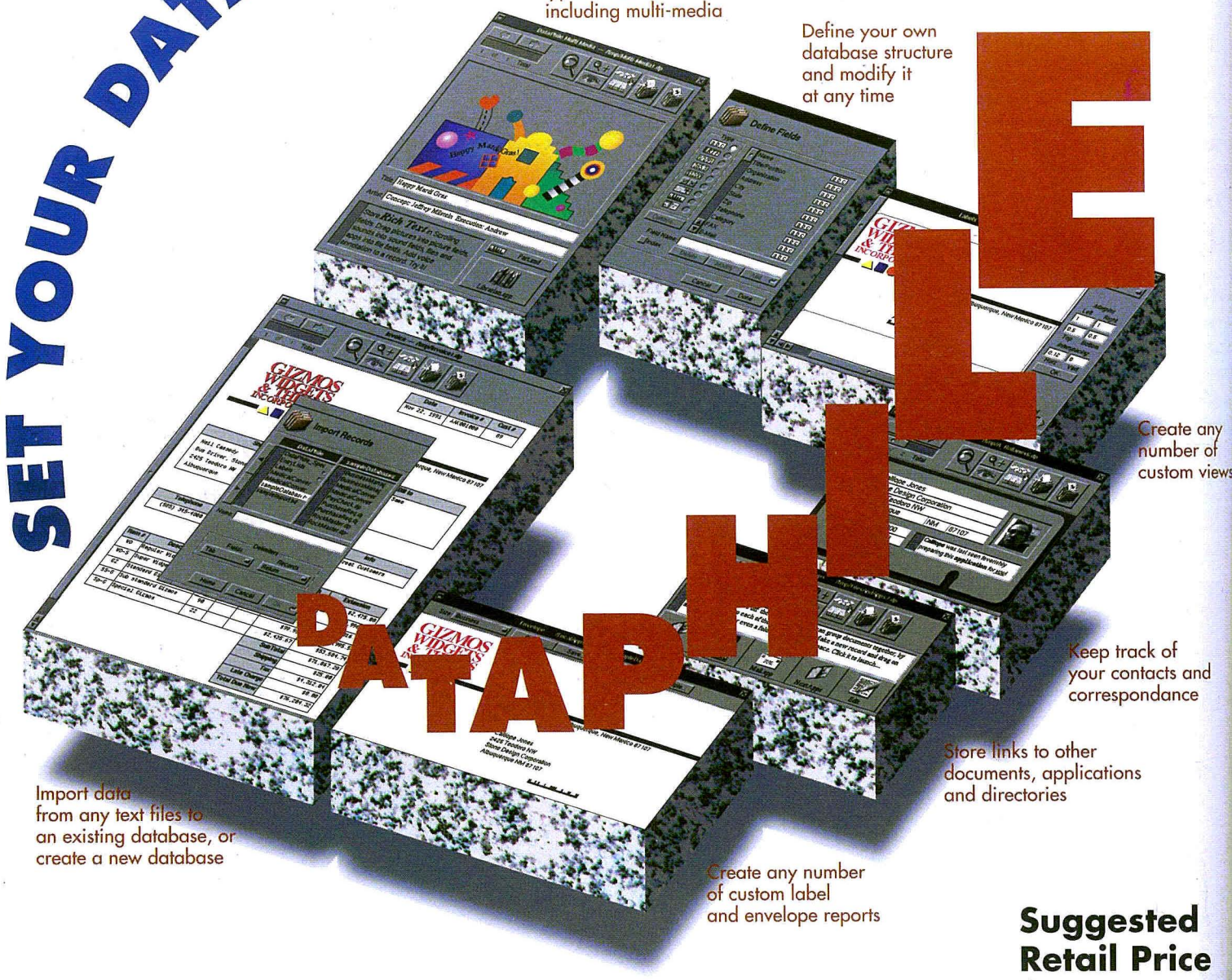


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